

Aberdeen Proving Ground  
(Edgewood Arsenal)  
Aberdeen  
Harford & Baltimore Counties  
Maryland

HAER No. MD-47

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MD,  
13-ABER,  
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Washington, DC 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

Aberdeen Proving Ground  
(Edgewood Arsenal)

MD-47

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13-ABER,  
1-

Location: In Harford and Baltimore Counties, Maryland,  
approximately 30 miles NE of Baltimore.

Date of Construction: Established in 1917.

Owner: Department of the Army

Significance: Encompassing both Aberdeen and Edgewood Areas,  
Aberdeen Proving Ground includes significant  
structures related to ordnance testing and  
development, chemical weapons research and production,  
and WW II mobilization temporary housing and  
administrative facilities. Aberdeen Proving Ground  
has been associated with many significant advances in  
20th century military technology.

Historical Report  
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Prepared for  
Transmittal by: Robie S. Lange, HABS/HAER, 1985.

## EXECUTIVE SUMMARY

Aberdeen Proving Ground (APG) is located in both Harford and Baltimore Counties, Maryland, approximately thirty miles northeast of Baltimore and seventy miles northeast of Washington, D.C. It comprises approximately 78,042 acres of property of which 39,100 acres are water and 38,942 acres are land. The installation is divided into two geographic sections: the Aberdeen Area to the northeast and the Edgewood Area to the southwest. Aberdeen Area includes the central built-up core, firing ranges and impact areas stretching southeast to the Bush River, Spesutie Island, and Pooles Island located one-half mile off the southern tip of Gunpowder Neck peninsula. Edgewood Area entirely occupies Gunpowder Neck peninsula and two smaller peninsulas, Grace Quarters, and Carroll Island. There are several other off-site areas owned by Aberdeen Proving Ground including the Churchville Tank Test Course Track, the Atkisson Dam (considered excess property), Deer Creek Area, and some Wherry housing complexes.

Aberdeen Proving Ground is a Test and Evaluation Command (TECOM) installation within the United States Army Materiel Development and Readiness Command (DARCOM). Its overall mission is to plan and conduct development tests, initial production tests, preproduction tests, and postproduction tests of weapons, weapons systems, rockets and missile systems, munitions and components, survey and target acquisition equipment, armor plate, combat, general and special purpose vehicles and ancillary automotive equipment, combat engineer equipment, troop support equipment, and other material as assigned.

Aberdeen Proving Ground consists of thirteen offices (including Phillips Air Field), six directorates, and thirty-four tenant activities. The largest tenant activities include: at Aberdeen Area - The United States Army Ordnance Center and School, The United States Army Ballistics Research Laboratory (BRL), and TECOM; at Edgewood Area - Chemical Systems Laboratory (CSL) and The United States Army Environmental Hygiene Agency (AEHA).

There is one Category I property at the Aberdeen area. There are eleven Category II properties at the Aberdeen area and twelve at the Edgewood area. At the Aberdeen area there are seventy-nine Category III properties and forty-nine at the Edgewood area.

National Register nominations have been prepared for the Pooles Island Lighthouse, and the Plumb Point Officers Housing area. The existing National Register Noimination for the ENIAC Building was revised.

## CONTENTS

Executive Summary

PREFACE.....	1
1. INTRODUCTION.....	2
Scope.....	2
Methodology.....	3
2. HISTORIC OVERVIEW .....	10
Pre-military History.....	10
Military History-Aberdeen Area.....	19
Military History-Edgewood Area .....	34
3. PRESERVATION RECOMMENDATION .....	44
Background.....	44
Category I Properties.....	48
Category II Properties .....	52
Category III Properties.....	62
BIBLIOGRAPHY .....	88
APPENDIX     Standardized Military Construction .....	92

## PREFACE

This report presents the results of an historic properties survey of Aberdeen Proving Ground. Prepared for the United States Army Materiel Development and Readiness Command (DARCOM), the report is intended to assist the Army in bringing this installation into compliance with the National Historic Preservation Act of 1966 and its amendments, and related federal laws and regulations. To this end, the report focuses on the identification, evaluation, documentation, nomination, and preservation of the historic properties at the Aberdeen Proving Ground. Chapter 1 sets forth the survey's scope and methodology; Chapter 2 presents an architectural, historical, and technological overview of the installation and its properties; and Chapter 3 identifies significant properties by Army category and sets forth preservation recommendations. Illustrations and an annotated bibliography supplement the text.

This report is part of a program initiated through a memorandum of agreement between the National Park Service, Department of the Interior and the U.S. Department of the Army. The program covers 74 DARCOM installations and has two components: 1) a survey of historic properties (districts, buildings, structures, and objects), and 2) the development of archeological overviews. Stanley H. Fried, Chief, Real Estate Branch of Headquarters DARCOM, directed the program for the Army, and Dr. Robert J. Kapsch, Chief of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) directed the program for the National Park Service. Sally Kress Tompkins was program manager, and Robie S. Lange was project manager for the historic properties survey.

This was one of five pilot studies undertaken by HABS/HAER in the summer of 1982. The remaining 69 DARCOM installations will be completed by a private contractor. Under the direction of John A. Burns, A.I.A. of HABS, the authors of this report were Katherine Grandine, William R. Henry, Jr., and Irene Jackson Henry. The authors of this report wish to acknowledge the following people for their assistance during this project: Paul W. Wirtz, Kenneth P. Statchiw, Joseph P. Ondek, Jr, Oscar Barry Elliot, Rosemary Austin, Sandra L. S. Green, Leonard Weston, Lyale Ostrander, Jack Keithley, The Ordnance Museum Staff, The Public Affairs Office, Lois Nielsen.

## Chapter 1

### INTRODUCTION

#### SCOPE

This report is based on an historic properties survey conducted during the summer of 1982 of all Army-owned properties located within the official boundaries of the Aberdeen Proving Ground. The survey included the following tasks:

- . Completion of documentary research on the history of the installation and its properties, and general research on the history of munitions production and storage.
- . Completion of a field inventory of all properties at the installation.
- . Preparation of an architectural, historical, and technological overview for the installation.
- . Evaluation of historic properties and development of recommendations for preservation of these properties.

Also completed as a part of the historic properties survey of the installation, but not included in this report, are HABS/HAER Inventory cards for 396 individual properties. These cards, which ordinarily constitute HABS/HAER Documentation Level IV, will be provided to the Department of the Army. Since taking photographs was prohibited in the Edgewood Area and the Restricted Area of Aberdeen Area those cards pertaining to those areas are incomplete and do not represent HABS/HAER Documentation Level IV. Archival copies of the cards with their accompanying photographic negatives, will be transmitted to the HABS/HAER collections at the Library of Congress. The methodology used to complete these tasks is described in the following section of this report.

The Gunpowder Meeting House (#E-5715) and Presbury House (#E-4630), both in Edgewood Area, are listed on the National Register of Historic Places. National Register Nominations were prepared for the Pooles Island Lighthouse and the Plumb Point Area, and the existing nomination form for the ENIAC Building was revised.

## METHODOLOGY

### 1. Documentary Research

Simultaneously with the visual survey, research was conducted in the Real Property Records kept in the Real Estate Offices at Aberdeen Proving Ground. This data provided the original building dates and building dimensions and confirmed the construction materials visually spotted. Drawings for each building were then sought from the architectural drawings file kept at the Facilities Engineering Directorate (FED) at Aberdeen Proving Ground. Great care has been taken by FED to microfilm all the existing drawings pertaining to the buildings located at Aberdeen Proving Ground. These easily retrievable and extensive records of both existing and demolished buildings also increased the amount of information on available standardized plans. The architectural records for Edgewood were not as complete; many original drawings from 1918 to 1940 were destroyed by fire or lost before they were entered into the Aberdeen system. For areas surveyed from the helicopter, or areas not otherwise accessible, descriptions were compiled without actual site verification; sometimes there were photographs attached to the real property cards. All buildings were then checked off on a numerical checklist to make sure that none had been missed.

The Historian found that there was no single repository for information on Aberdeen; it was scattered among many organizations including FED, TECOM headquarters, the Ordnance School, and the Public Affairs Office. Always, the information on Aberdeen Proving Ground itself was secondary to the main interest of the source organization. The TECOM Historian was helpful in providing general background

information on Aberdeen Proving Ground from his files; his official duty is to compile the current history of TECOM and its installations of which Aberdeen Proving Ground is only one of five. The Deputy Director of FED also provided much material including photographs, maps, and literature from his files. The team was grateful for his enthusiasm for the project and his experiential knowledge of the base. Some of these organizations had information on Edgewood, but the body of Edgewood's information collected came from libraries located off post. Edgewood was so different that it was decided that a separate historical overview should be written. The primary sources most helpful were historic photographs and maps which aided in understanding the development phases of the base. Secondary sources such as published articles and books were most helpful in establishing the overall significance of the installation in military history. A complete listing of this documentary material may be found in the bibliography.

## 2. Field Inventory

The buildings located in the main corridor of Aberdeen Area were readily accessible; those located in the Restricted Area of Aberdeen Area and in the Edgewood Area were not as accessible because of security and safety reasons. To reach these areas, escorts had to be arranged. The same constraints applied to photography; no photographs were allowed at Edgewood or in the Restricted Area of Aberdeen Area.

Access into the Restricted Area was limited both by the schedules of personnel providing the escorts and by the constant firing program conducted at Aberdeen Proving Ground. However, the Environmental Management Office provided the team with a boat trip to Pooles Island and a helicopter flight over the down range area. This flight allowed the survey team to assess the significance of the otherwise inaccessible areas of Graces Quarters, Carroll Island, Maxwell's Point, and other down range bombing fields.

The Edgewood Area of Aberdeen Proving Ground provided special problems in terms of surveying. Even though the two areas are now administratively combined, the difference between Aberdeen proper and Edgewood is striking. The immediate

contact people helping the team through the entire survey were not thoroughly acquainted with Edgewood Area causing an information imbalance in that direction. Corrections to that information bias were not made until late in the summer when it was too late to establish the necessary contacts in the Chemical Systems Laboratory. The visual survey of Edgewood was completed under the auspices of an escort who travelled with the team for four days.

Field inventory procedures were based on the HABS/HAER Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures.<sup>1</sup>

Building locations and approximate dates of construction were noted from the installation's property records and field-verified.

Interior surveys were made of major facilities to permit adequate evaluation of architectural features, building technology, and production equipment.

Field inventory forms were prepared for, and black-and-white, 35-mm photographs taken of, all buildings and structures through 1945 except basic utilitarian structures of no architectural, historical, or technological interest. When groups of similar ("prototypical") buildings were found, one field form was normally prepared to represent all buildings of that type. Field inventory forms were also completed for representative post-1945 buildings and structures. Information collected on the field forms was later evaluated, condensed, and transferred to HABS/HAER Inventory cards.

### 3. Historic Overview

A combined architectural, historical, and technological overview was prepared from information developed from the documentary research and the field inventory. Maps and photographs were selected to supplement the text when appropriate.

The objectives of the overview were to 1) establish the periods of major construction at the installation, 2) identify important events and individuals associated with specific historic properties, 3) describe patterns and locations of historic property types, and 4) analyze specific building and industrial technologies employed at the installation.

4. Property Evaluation and Preservation Measures

Based on information developed in the historic overviews, properties were first evaluated for historic significance in accordance with the eligibility criteria for nomination to the National Register of Historic Places. These criteria require that eligible properties possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that they meet one or more of the following:<sup>2</sup>

- A. Are associated with events that have made a significant contribution to the broad patterns of our history;
- B. Are associated with the lives of persons significant in the nation's past;
- C. Embody the distinctive characteristics of a type, period or method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction;
- D. Have yielded, or may be likely to yield, information important in pre-history or history.

Properties thus evaluated were then placed in one of the five Army property categories listed in the Army Regulation on Historic Preservation:

- |              |   |
|--------------|---|
| Category I   | Properties of major importance  |
| Category II  | Properties of importance  |
| Category III | Properties of minor importance  |
| Category IV  | Properties of little or no importance at this time                          |
| Category V   | Properties detrimental to the significance of adjacent historic properties. |

Based on an extensive review of the architectural, historical, and technological resources identified on DARCOM installations nationwide, four criteria were developed to help determine the appropriate categorization level for each Army property. These criteria were used to assess the importance not only of properties of traditional historical interest, but also the vast number of standardized or prototypical buildings, structures, and production processes that were built and put into service during World War II, as well as properties associated with many post-war technological achievements. The five criteria were often used in combination and are as follows:

- 1) Degree of importance as a work of architectural, engineering, or industrial design. This criterion took into account the qualitative factors by which design is normally judged: artistic merit, workmanship, use of materials, and functionality.
- 2) Degree of rarity as a remaining example of a once widely used architectural, engineering, or industrial design or process. This criterion was applied primarily to the many standardized or prototypical DARCOM buildings, structures, or industrial processes. The more widespread or influential the design or process, the greater the importance of remaining examples of the design or process was considered to be. This criterion was also used for non-military structures such as farmhouses and other once prevalent building types.
- 3) Degree of integrity or completeness. This criterion compared the current condition, appearance, and function of a building, structure, architectural assemblage, or industrial process to its original or most historically important condition, appearance, and function. Those properties that were highly intact were generally considered of greater importance than those that were not.
- 4) Degree of association with an important person, program, or event. This criterion was used to examine the relationship of a property to a famous personage, wartime project, or similar factor that lent the property special importance.

The majority of DARCOM properties were built just prior to or during World War II, and special attention was given to their evaluation. Those that still remain do not often possess individual importance, but collectively they represent the remnants of a vast construction undertaking whose architectural, historical, and technological importance needed to be assessed before their numbers diminished further. This assessment centered

on an extensive review of the military construction of the 1940-1945 period, and its contribution to the history of World War II and the post-war Army landscape.

Because technology has advanced so rapidly since the war, post-World War II properties were also given attention. These properties were evaluated in terms of the nation's more recent accomplishments in weaponry, rocketry, electronics, and related technological and scientific endeavors. Thus the traditional definition of "historic" as a property 50 or more years old was not germane in the assessment of either World War II or post-war DARCOM buildings and structures; rather, the historic importance of all properties was evaluated as completely as possible regardless of age.

Property designations by category are expected to be useful for a minimum of ten years, after which all categorizations should be reviewed and updated.

Following this categorization procedure, Category I, II, and III historic properties were analyzed in terms of:

- Current structural condition and state of repair. This information was taken from the field inventory forms and photographs, and was often supplemented by rechecking with facilities engineering personnel.
- The nature of possible future adverse impacts to the property. This information was gathered from the installation's master planning documents and rechecked with facilities engineering personnel.

Based on the above considerations, specific preservation recommendations were developed for each individual property as circumstances required. These recommendations supplement the general measures presented in Chapter 3 that apply to all Category I, II, and III properties.

NOTES

1. Historic American Buildings Survey/Historic American Engineering Record, National Park Service, Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures (unpublished draft, 1982).
2. National Park Service, How to Complete National Register Forms (Washington, D.C.: U.S. Government Printing Office, January 1977).

## HISTORY OF ABERDEEN PROVING GROUND

PRE-MILITARY HISTORY

## JOHN SMITH'S VOYAGES

History records that on June 2, 1608, Captain John Smith, in the company of several of his men, left the newly begun settlement of Jamestown on the James River in Virginia. This exploratory voyage was to take him down the James and around the point of land now comprising Hampton and Newport News, Virginia, where he continued up the Chesapeake Bay. Smith and his adventurers were to explore as far as the Bolus (now Patapsco) River where he was forced to turn back because of an illness he and his party contracted by eating spoiled food. Smith returned to Jamestown on July 21, 1608, but set sail again three days later to continue his explorations. It was the second voyage which took Smith to the head of the Bay, for in his diary he mentions the four rivers that empty into the Bay: the Elk, Susquehanna, North East, and Sassafras Rivers.

Many of the place names in use today are those ascribed to the area by Smith and his men. Pooles Island was originally called Powells Island after Nathaniel Powell, one of Smith's party. Bush River was originally called Willowby River after Smith's birthplace in England, and Smith Falls is an obvious example.

## FIRST LAND GRANT

A land grant for this area was first issued in 1624 between English King James I and the First Lord Baltimore. This included present-day Delaware, Maryland, portions of Pennsylvania, including Philadelphia, and a portion of Northern Virginia. However, before the grant could be taken up, both the King and the First Lord Baltimore died. An identical grant was issued to the Second Lord Baltimore who sailed from England on November 22, 1633. However, the claim of the Second Lord Baltimore was to be contested and argued before the Privy Council because of a later grant to the King's brother, the Duke of York. The dispute was to continue for years but was finally settled after Lord Baltimore yielded to the request of William Penn regarding the area that is now part of Pennsylvania.

~~10~~

## ORIGINAL COUNTIES AND SETTLEMENT

Upon the arrival of Lord Baltimore, the process of laying out counties on the land began. The first counties to be established were St. Mary's, Calvert, Anne Arundel, and Baltimore. The original Baltimore County was much larger than the present Baltimore County; being comprised of what are now Kent, Cecil, Harford, Carroll, and Baltimore Counties.

By the middle of the 17th century the Susquehannok Tribe controlled most of the territory between the Patuxent River and the head of the Bay. In an attempt to avert large scale hostilities between the colonies and the Indians, a treaty was negotiated in 1652. This gave title to the area between the Patuxent and the Susquehanna Rivers to the European colony.

Following a pattern typical of early colonial settlements, the first land patents were taken up along watercourses. Later, as land along the water became scarce, settlers moved inland. The reasons for settling along the shores are obvious; initially, lands reachable by water were easiest to get to, and also provided an excellent means for communication and commercial transportation.

In the area of Aberdeen Proving Ground, two major necks or peninsulas reach into the Bay. These major necks are Bush River Neck and Gunpowder Neck. These necks were ideally suited for settlement, being fertile and water-accessible. Game and fish abounded.

## EARLY SETTLEMENT

The first known European settlement on what is now Aberdeen Proving Ground was on what was originally called Bearson's Island, now called Spesutie Island. The island was formally granted to and settled by a Colonel Nathaniel Utie in 1658, shortly after the treaty of 1652 with the Susquehannoks. He established a trading post under the Maryland Colonial Authority, and was granted a license to trade with the Indians in 1658. The island was renamed Spesutia; spesutia being derived from the Latin term for Utie's Hope.

In 1661, a second patent was granted to Edward Beedle, who, with his family, settled on the mainland just across Spesutie Narrows from the island. The next settler to take up land was William Carpenter, probably an Indian trader, who settled on a tract opposite Spesutie Island.

By the latter part of the 17th Century, many of the settlers of Anne Arundel County were expanding and taking up claims on the eastern sides of both the Bush and Gunpowder Rivers.

One of the earliest settlers to take up land was one Thomas Thurston, a Quaker. He first settled in Massachusetts, later came to Virginia, and finally settled on Bush River Neck in the vicinity of Old Baltimore. His home is said to have been at Old Baltimore in 1686, but no remains are apparent today.

Thomas O'Daniel was one of the first settlers to petition for a patent for land on Gunpowder Neck, and Lord Baltimore granted the patent in 1663. In 1681, one of O'Daniel's daughters married William Horne, who was granted a strip of land running out to the end of what is now called Maxwell Point. William Horne called his plantation Hornisham.

In 1666, Captain John Watterson, a native of the Isle of Wight and a surgeon by profession, settled on Gunpowder Neck near what is today called Watson's Creek. Although originally named Watterson's Creek, the creek bears today a name corrupted by time and usage. Some of the other prominent landholders were: Matthew Gouldsmith, who settled on Swan Creek, Bernard Utie on Mosquito Creek, Thomas Sockett in the area between Swan Creek and the Bay, and George Utie on Romney Creek. William Osoorne and several other landholders settled on the narrow neck between Bush River and Romney Creek, near the area now called Old Baltimore. In August 1659, one Oliver Sprye settled on an island at the mouth of Gunpowder River; the island, though nearly washed away, today bears his name. Prominent settlers on Gunpowder Neck between 1650 and 1700 were Colonel James Maxwell, Robert Gorsuch, John Collett, Captain James Gouldsmith, James Presbury, and Colonel Charles Sewell, or Sowell.

While this report mentions several of the early settlers of this area, it is difficult to be exact in determining the extent, duration, and location of their tracts without more intensive research.

## LAND TRANSFERS AND PLANTATION NAMES

Conveyances for the transfer of land in colonial times was often accomplished by a simple exchange of goods, with no written records kept. Other methods involved merely endorsing a patent or writing the exchange agreement on paper, with the involved parties exchanging agreements. Other methods involved no written agreements at all. The establishment of formal provisions for the written, indented (indexed), scaled, and recorded conveyances for land transfers were not made until the latter half of the 17th century. Today many of these records still exist, but others have been lost or destroyed and are no longer available to the researcher.

English law of the 17th century, unlike today's statutes, required each land owner to have his name and a name for his plantation or farm entered on rent rolls for the purpose of taxation. Today some of these names still remain in use. Many of these names are amusing or quaint; others reflect the hopes and expectations of their owners. One of interest still used today is the name of the tract owned by Thomas Overton in 1665; Penny Come Quick. Today this names applies to an area downrange oetween the Bush River and the main firing range.

Peter Bond, originally of Anne Arundel County, patented "Harris Trust" in 1660 and 31 years later purchased an adjacent tract called "Prosperity", which lay on both sides of the Bush River. Peter Bond's son, Thomas Bond, patented a tract called "Knaves Misfortune" near his father's property. Thomas Bond is believed to have built a large home near the site of the town of Emmorton.

Peter Bond's grandson, John Bond, married Alice Ann Webster, and in company with his relatives, Isaac, John Lee, and James Webster, and another man named Jacob Giles, organized the Bush River Company in 1776. They erected and operated one of the first iron furnaces in the colony of Maryland, the Harford Furnace.

## EARLY CHURCHES

Early English settlements of the tidewater and bay regions generally followed a similar method of construction development. The erection of small shelters and the building of some defense fortification was often followed by the erection of a church as tne first

public building. The church served the population both as place of worship and meeting hall. The first such church in the Aberdeen Proving Ground area is reported to be that in Utie Hundred, and was named for the island; Spesutie Church. Its location was near the Red Lion Branch of Delph Creek, on what was the main road of Bush Neck. This place was called Gravelly, and was near Michaelsville Range, as it is called today. The first structure built for Spesutie Church was erected in 1671 and remained at the same location until 1718. In 1718, the parish seat was moved to Perryman and a new church was built. The new structure remained in use until 1758 when it was demolished and a new church built. This building was later replaced by a second new structure built in 1851. It is believed that the old Spesutie Parish was renamed St. George's Parish during the last quarter of the 17th century.

#### OLD BALTIMORE

The first formal authorization for the establishment of a Court House was the 1674 Act of Assembly for the construction of a Court House and town to be laid out on the Bush River. This Courthouse is believed to have been constructed on land belonging to William Osborne, a ferryman. Osborne operated a ferry across the Bush River to a point near the residence of William P. Taylor on Gunpowder Neck. The court house location has been accepted for a number of years as being on the northern side of the Bush River, approximately two miles from the Amtrak Railroad Bridge.

The exact location of the Court House remained in doubt for a number of years until 1958, when Joseph L. Hughes, a Harford County historian and writer, prepared a paper on the subject. In his research Mr. Hughes was to find a plate of one of William Osborne's descendants, a James Osborne, entitled Common Garden Corrected. This was a deposition of James Osborne's property upon his death dated 6 April 1779. Through Hughes's extensive research, he was able to conclude that a 1686 land transfer between William Osborne and James Phillips was indeed the tract of land that the Court House occupied. Today the only visible remains at the site of Old Baltimore is the Phillips Cemetery, maintained by the Proving Grounds.

Little is known about the appearance of the Court House or the town of Old Baltimore, sometimes referred to as Bush. It is believed that William Osborne built the first house on the site but this has not been verified. An ordinance by the Proprietary Council on 10

June 1676 authorized the construction of an ordinary (inn) at Baltimore/Bush to provide food, drink, and accomodation for the Assembly and for travelers.

The activities of the court and assembly or of the town are little known. It is prooable that the permanent population of the town was quite small and that only when the Assembly was in session was the population of any size. With the development of an inland road and communications system the Court House became isolated by the topography of its setting; on the river and away from the developing inland. In 1686 a petition was presented to move the Court from Baltimore/Bush to a point south of Winter's Run, near the track that linked the Potomac and Susquehanna Rivers. This petition was rejected and the court remained at Bush for the next quarter century until it was moved to a place called Gunpowder. The exact date of the move is not known, but the 1695 term of court saw John Ferry offer four thousand pounds of tobacco for the court building, and the court, receiving no higher bid, awarded the Court House building to John Ferry in 1696. The last official recorded meeting at the Court House was in 1692, at which Thomas Heath, innkeeper, filed suit for expenses incurred by the Justices at the 1687, 1688, and 1689 convenience of the court.

#### NEW COUNTIES

Harford County, as previously stated, was part of Baltimore County, and did not become a separate county until 1774. The new county was named for the sixth Lord Baltimore's illegitimate son, Henry Harford. The county had been well settled and many large and small plantations and farms existed. We have already mentioned several of the more prominent early settlers such as the Uties, Osbornes, Halls, and Oliver Sprye.

With the creation of Harford County, the Court, which had been moved again to Joppa, was abandoned, as it rested within the boundary of Baltimore County and not Harford County. The newly appointed county commissioners authorized the construction of a new Court House and prison on land adjoining Bushtown, at the head of the Bush River. Renamed Harford Town, the county seat was used as such until 1787 when the county seat moved to Bel Air, where it remains to this day.

## EARLY ROADS

Early colonial roadways generally tended to follow the existing Indian trails, and tradition suggests that these roads were widened as horses and later horse and wagon replaced foot travel. With the development of tobacco plantations the hogsheads rolled along these primitive trails and widened them even more, as the tobacco was taken from plantation to waterfront for shipment by boat. The first major roadway to develop in the Aberdeen Proving Ground area was Gravelly Road. This road ran from the Bush River near Chilbury Point to Spesutia Narrows and Swan Creek. By 1729 Swan Point was a major center of commercial activity; tobacco was rolled down the road past what was known as Hall's Crossroads, now in the town of Aberoeen, to Swan Point where it was loaded on vessels for shipment to England and other colonial ports. Hall's Crossroads was the intersection at which travelers could take the up country road into Pennsylvania or Gravelly Road which led south past the Spesutie Church near Michaelsville, and then to Bush (Old Baltimore) on the east side of Bush River. From Bush a ferry was used to cross at a place referred to as Ferry Bar then another road crossed Gunpowder Neck to Joppa. The road then went up along what was called Long Cam or Ridgely's Foro to meet with the Old Post Road between Philadelphia and Baltimore. By 1800, Hall's Crossroads consisted of several buildings, including a tavern, which served as a relay station for the stage coach of the Philadelphia Post Road.

## REVOLUTIONARY WAR

The Philadelphia Post Road which runs through Harford County had long been in use as the route over which goods and people traveled going north and south. The influence of the Post Road is difficult to assess; however, it is important to remember that many influential and prominent colonial statesmen stopped for the night here during their travels to and from the Continental Congress in Philadelphia. Washington, Macison, the Lees, Peyton Randolph, and Jefferson were frequent overnight guests at the tavern at Bush. Conversations during these overnight stays undoubtedly turned to the questions and issues that were facing the nation and congress. Such prominent persons as Aquila Hall, Aquila Paca, and others engaged these statesmen in conversation. The result of these conversations were to benefit Harford county, for the people of this area were constantly informed as to the course the emerging nation was taking. Such strong supporters of the ideas of liberty were to be found in Harford County that in March of 1775, a declaration of independence was issued which would be echoed the following year

in the Declaration of Independence penned by Jefferson in Philadelphia. The declaration signed in Harford County is known as the Bush Declaration and many consider this to be one of the first expressions of independence made by people of the new nation.

## WAR OF 1812

Hostilities with Great Britain were renewed in 1812, and by December of that year a naval blockade was established along the American coastline. During the first weeks of 1813, the British Fleet, under Admiral Cockburn, entered the Chesapeake Bay and took possession of the town of Newport News, Virginia.

During the spring of 1813, the British Fleet progressed northward up the Bay destroying and plundering as they chose. The American Forces being poorly trained and undisciplined presented little resistance until Cockburn's fleet attacked the City of Baltimore. The staunch defense of Fort McHenry forced the British Fleet to withdraw and abandon their efforts to take Baltimore. However, despite the setback at Baltimore, Admiral Cockburn continued his thrust north toward the head of the Bay. Sharp's, Poole's, Tilghman's and Poplar Islands were all taken and pillaged. By early May 1813, British Forces lay off the town of Havre de Grace, which after a short bombardment capitulated to the British. Cockburn's fleet returned to the Lower Bay never to venture north again. The hostilities with Great Britain ended with the Treaty of Ghent, December 1814.

## RAILROADS AND THE CIVIL WAR

The construction of the Pennsylvania Railroad in 1835-1836 and the Baltimore and Ohio Railroad in 1880 on courses near the Post Road, resulted in Hall's Crossroad's becoming a major shipping point. Farm produce was shipped northeast to Philadelphia, and southwest to Baltimore. With the outbreak of the Civil War the importance of the railroad became greatly increased as it represented one of the major routes over which military material was sent from the manufacturing North to Federal Forces in the South and Washington. As a result of the defeat of Union General Lewis Wallace's forces at the battle of Monocacy during the defense of Frederick, Confederate General Bradley Johnson's forces were able to operate around Baltimore with only minor resistance from Union Forces. Major Gilmore was detailed to conduct such operations in the area of Harford County. Gilmore's cavalry struck the railroad at Magnolia Station near Edgewood, capturing the

11

express train from Baltimore. They set the train ablaze and placed it on the bridge over Gunpowder River; both train and bridge were destroyed. In addition, a second train was captured and also destroyed. Having achieved his objective, Gilmore's troops rejoined General Johnson, who was at Cockneysville, Maryland.

## CANNING INDUSTRY

One of the most important industries to develop in the 19th Century in the area was the canning industry. The abundant produce grown on local farms needed to be sent to markets and it was found that processed and canned goods were profitable. Processed produce increased volume and reduced shipping costs. The growing cities of the 19th century provided ready markets and the railroad provided quick and efficient means by which to get the goods to the marketplace.

The first cannery in operation in the Aberdeen Proving Ground area was George Baker's cannery, which began operations in 1867. By late 1880's the industry had become so widespread that most of the larger farms operated their own facilities. Shoe-peg corn was the major crop canned.

The canning industry was so successful that Baker's five surviving sons each operated separate canneries, and all were successful. Prior to the Presidential Proclamation of 1917, creating the Proving Ground, one of George Baker's sons, Charles W. Baker, operated a successful corn cannery business in the Plumb Point area. Another prominent cannery operating prior to 1917 was that of F. O. Mitchell and Brothers, of Perryman.

## AGRICULTURE AND HUNTING

Besides the agricultural industry of canning, agriculture itself was a profitable endeavor in the Aberdeen Proving Ground area. The many plantations and estates begun in the 17th and 18th Centuries were passed from family to family and were consolidated in some cases into larger farms and in other cases broken down into smaller holdings. Many of the same families who had been in the area since the early days of settlement retained their estates: the Osbornes, Mitchells, and Halls, to name a few. Other people bought land and began their own estates. By 1850 General George Cadwallader had purchased eight thousand acres of land comprising most of Gunpowder Neck.

~~18~~

Cadwallader and many others were attracted to the upper Chesapeake lands not only for the farming but also the fowling. The lands comprising Aberdeen Proving Ground lie in the Chesapeake Flyway and wildfowl appear in great numbers along the marshes and creeks. The duck and goose hunting in the area attracted both market hunters and sportsmen.

#### GUN CLUBS AND HUNTING LODGES

The well-off sportsmen of the 1880's and 1890's pursued their sport from posh gun and hunting clubs. Among these clubs was Cadwallader's Club at Maxwell Point, a large complex with stables, kennels and many ornamental trees. A lamp post and hitching post from Maxwell Point are supposedly installed at the Edgewood Officers Club.

The Philadelphia Gun Club, the San Domingo Gun Club and the New York Gun Club were all ultra-selective clubs, catering to the wealthy and famous such as presidents, politicians, and financiers. J. P. Morgan was a member of the New York Gun Club, which had its elaborate lodge on Spesutie Island. The building was used by the Army as quarters until a fire and termite damage resulted in its destruction. Other gun clubs on Gunpowder Neck and Bush Neck were: Cedar Grove, Riverside, Tapler's Bar, and Lego Point.

### MILITARY HISTORY - ABERDEEN AREA

#### WORLD WAR I MOBILIZATION

America's call to arms necessitated by her involvement in the First World War caused many changes in American life. Never before had so many of its men been required to serve and never before had its industrial flexibility been so tested. America answered the need for men by creating the largest conscription army in its history. Industry also responded. Almost overnight, camps were built to house the new army, training facilities

were created, and industry switched from production of consumer goods to munitions. With this change in the industrial focus of the country, new facilities were needed for the testing and development of munitions.

#### NEW PROVING GROUND SELECTION

Prior to the entrance of the United States into the First World War, the majority of all military ordnance testing and experimental work was conducted at Sandy Hook Proving Ground, Fort Hancock, New Jersey. Established in 1874, Sandy Hook was the Army's munitions laboratory and acceptance testing (proofing) grounds. As the war in Europe escalated it became evident that the facilities at Sandy Hook were neither large enough nor adequate for the increased ranges and work load required by the Ordnance manufacturing and testing program.

The selection process of a new site for a proving ground began in June of 1917 with the selection of a Board of Officers headed by Colonel G. L. H. Ruggles. Colonel Ruggles would eventually be the first commander of Aberdeen Proving Ground.

Important factors in site selection were: accessibility from principal industrial and manufacturing areas, a climate which extended the working season, and a large and remote enough area to allow safe, undisturbing and undisturbed testing.

The committee investigated many different areas for suitability and recommended that Kent Island in the Chesapeake Bay be chosen as the site for the new proving grounds. However, this was not to progress. Protests from the Kent Islanders, backed by political forces in Maryland, forced the Board to withdraw the Kent Island nomination.

As an alternative, and in some respects a preferred choice, the Board recommended an area of Harford County, Maryland, south of the town of Aberdeen. It met all the aforementioned requirements and was preferred for having the Pennsylvania Railroad and the Baltimore and Ohio Railroad at hand, as well as being midway between Philadelphia and Washington, D.C., and four hours from New York.

## PRESIDENTIAL PROCLAMATION

Although local landowners and townspeople protested the governments take-over of such fertile farmlands and estates, they lacked the political support the Kent Islanders had been able to rally. President Wilson and Congress began work on acquiring land for the new proving grounds. On October 6, 1917, an Act of Congress provided the authority under which the land was acquired. The first of three Presidential Proclamations was issued on October 16, 1917, taking over the land for the use of the War Department. Two other proclamations followed: #1418 on December 14, 1917, and #1508 on January 25, 1919.

## ABERDEEN PROVING GROUND BEGUN

The Government took possession of the properties on October 20, 1917, and by November a commission was set up to determine the values upon which to base Federal compensation to the owners. Recollections of people there at the time place compensation at \$100.00 an acre. Construction began on the Proving Ground by the 21st of October with the erection of four barrack-type buildings. Aberdeen Proving Grounds first Construction Officer, Major A. B. Roberts, noted that two of the structures were to house outside contractors who were beginning work on the cantonment camp and two were to house troops stationed at the new proving ground. A carpentry shop was also constructed; now building #335.

On November 17, 1917, a small group of men was transferred from Sandy Hook to help build the new proving ground. What they found was certainly not encouraging. There were few buildings to shelter men, let alone begin ordnance testing. The roads that did exist were dirt and prone to impassability. Most of the purchased land had been in corn and turned into incredible quagmires of cold mud after the slightest autumn rainfall. The people turned out of their homes and farms were upset at their dispossession, even though many came to see their sacrifice as their patriotic duty.

With winter coming on, work proceeded with haste. A few additional barracks were quickly built. By December there were twelve buildings, including barracks, a storehouse, and a post exchange. Despite the lack of good roads and a complete on-post rail system, materials and supplies arrived in good time. The construction process became the responsibility of the Maryland Dredging and Contracting Company, which had

been awarded the initial construction contract. By the end of December, 1917, the Proving Ground had a half dozen officers and two hundred enlisted men in residence, plus those civilians that were hired by the Maryland Dredging and Contracting Company.

### FIRST FIRING

The first shots at the new Proving Ground were fired on the 2nd of January, 1918. Contemporary reports state that the first shot was fired by Mrs. Edward V. Stockham, of Aberdeen, with whose husband Colonel Ruggles had been associated at West Point. The report continues to say that the first tests made that day were of shrapnel shells from the contract lot of the Bartlett-Hayward Company. The ordnance used consisted of several field pieces; the first, used for the initial shot, was a 1905 Army model, made in 1914 by Bethlehem Steel Company. Also used was a 1902 model made at the Watervliet Arsenal in 1915. Perhaps the most interesting piece fired that day was a French '75', a 75mm gun that had been used at the battle of Verdun. This piece is significant, for throughout the years many pieces of foreign ordnance, both allied and enemy, would be tested at Aberdeen.

Colonel Ruggles presided over the first firing, but was promoted and replaced by Colonel William A. Phillips on March 5, 1918. Colonel Phillips, more than anyone else in these early days, directed the tasks that made a small city emerge from land that the year before had been seeded in corn. A severe influenza epidemic from January to November of 1918 caused many problems including the deaths of eighty-one military men, as well as civilian deaths.

During the early months of 1918, proof firing continued, as did work on the cantonment camp construction. By mid-January the rail spur from Aberdeen to the Proving Grounds was complete, allowing greater numbers of supplies and munitions to be delivered in better time. Rail service within the proving grounds was extended and within months the main front battery, water range, and trench warfare areas were connected by rail. The construction of barracks and other buildings increased with the numbers of men arriving.

### SCHOOLS ESTABLISHED

In May, anti-aircraft fire testing began and was added to the responsibilities of the Range Firing Section. It soon was evident that the Army lacked the trained personnel

needed to conduct the proofing and firing necessary for such a large and diversified war effort. Also, officers were needed for use on the lines in battle. The need for trained men led to the establishment of the Ordnance Training School at Aberdeen Proving Ground and at other installations. Its purpose was to train enlisted men who could then be commissioned as second lieutenants in the Ordnance Department. In addition to the technical aspects of the ordnance work, these students were also trained to become line officers.

The Railway Artillery School was also established, to train men to repair, maintain and fire the large railway guns in use in Europe at the time.

#### ORDNANCE TESTING AND DEVELOPMENTS

In addition to firing ranges for artillery, Aberdeen Proving Ground had facilities for the testing of aerial bombs, bombsites and other forms of aircraft armament. That weaponry became increasingly important as the First World War progressed. An airfield near Spesutie Narrows was constructed and an air squadron formed. The Heavy Bombardment Squadron and the Balloon Company of the Air Service tested material at Aberdeen Proving Ground. The site of Old Baltimore was the site of balloon bomb testing from January 15, 1918, until February 12, 1919, when a site near the "ex-town" of Michaelsville came into use. The first extensive testing of dive bombing techniques as well as the first four-thousand pound bomb tests were accomplished at Aberdeen Proving Ground.

In addition to the experimental work carried on with aircraft, one of the outstanding early developments of the proving ground was the invention of what is now known as the Aberdeen Chronograph. This device was used to measure ordnance velocity. Up until its development there had existed a critical shortage of accurate measuring devices in the field of ordnance, and the only available device at that time was the Boulenger chronograph.

Another of the major ordnance developments to come out of the war was the extensive use of machine guns. Combat experience with these weapons quickly made it apparent that more extensive and scientific testing was necessary to develop the weapon to its full

potential. In an effort to learn more about the weapon and to provide a suitable and large enough testing area, a small arms testing range was built at Aberdeen Proving Ground.

However, the most successful of the new battlefield weaponry was the tank. While the use of armored vehicles was not a new idea, and they had been tested and used before, they were never developed into the massive armored machines that were introduced during the First World War. Although limited testing was conducted on tanks during the war, it was not until after the war that any extensive testing was done on the new war machine.

## CONSTRUCTION

By the time the Armistice was signed - November 11, 1918, - a total of 324 buildings had been erected at Aberdeen Proving Ground. Most were temporary structures, standardized Army mobilization types, (600 series mobilization buildings). These cantonment structures were wood frame, mostly one-story buildings and included barracks for civilian and military personnel, mess halls, a hospital, recreational facilities, stables and administration buildings. There were, in early 1919, fifty civilian barracks and sixteen mess halls, sixty enlisted men's barracks and nineteen mess halls for their use.

In addition to the temporary buildings constructed, twenty-six buildings of a permanent nature were constructed. These included the telephone exchange, #311, a railway station, now gone, the headquarters building, #310, an ordnance warehouse, #320, the commissary, #321, a power plant, #343, assembly plant, #314, and a well equipped machine shop, #315. Observation towers, water towers, and other structures were built. The basic distinction between temporary and permanent construction is that temporary structures are generally wood framed and sheathed, and permanent structures are of masonry or metal frame construction. However, certain buildings such as officers housing are rated as permanent construction although they may be of wood construction. By June 30, 1919, thirteen single-family and seven two-family duplexes were built on Plumb Point and Hopkins Row for officers and their families. There were also sixty-five single houses and five dormitory buildings built in the town of Aberdeen for civilian employee housing. These were started by the United States Housing Corporation in February of 1918, and finished by May 1, 1919.

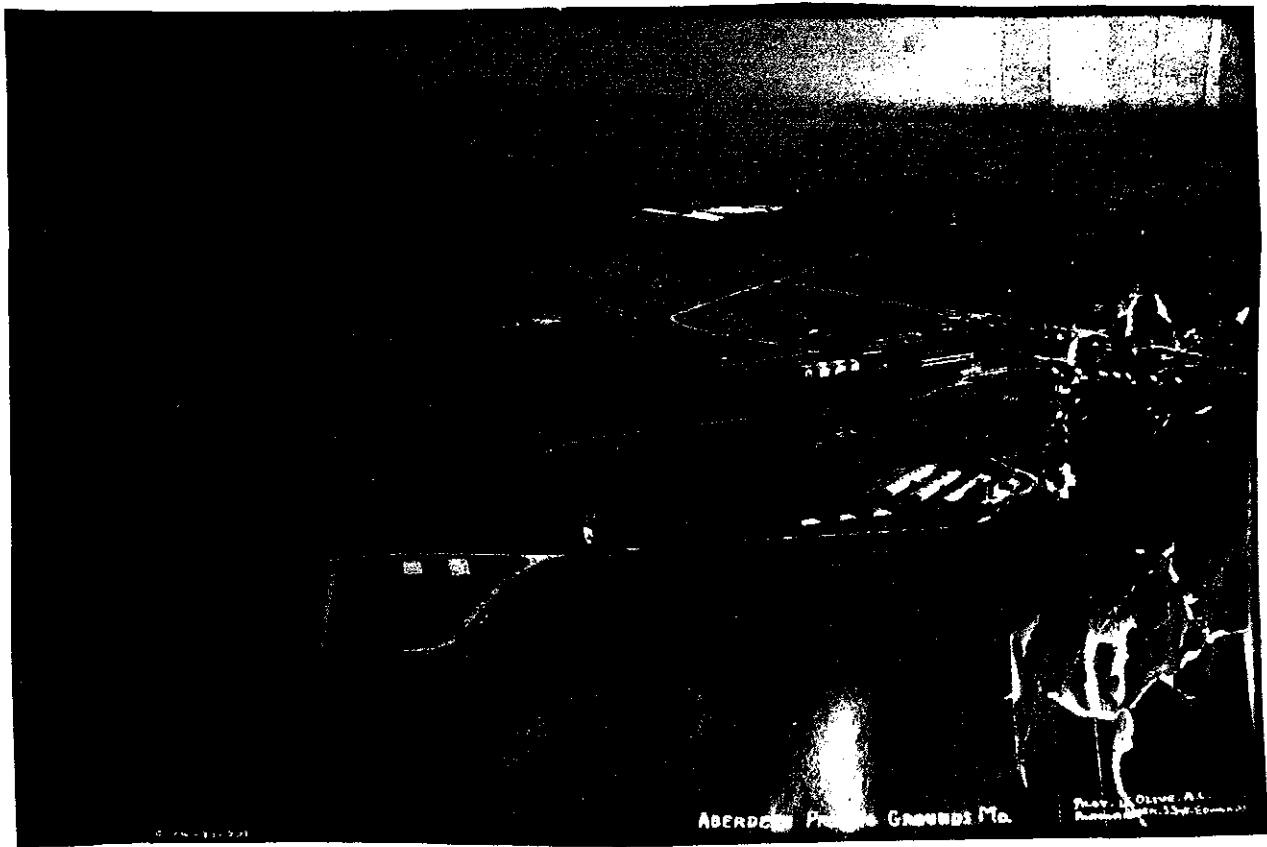
Eleven miles of concrete roads, seventeen miles of sewer pipe, fifteen miles of electrical wiring and thirty-two miles of railway track were laid by 1919. The extensive use of rail service at the proving ground is evident by the wartime inventory of rail equipment which included eight locomotives, seventeen locomotive cranes, thirty-four railroad cars, and eight passenger coaches, one of which is still used as an office in the Salvage Yard. This inventory was greatly reduced after the Armistice.

#### POST WORLD WAR I ACTIVITY

Much of the work was stopped on uncompleted projects; however, this did not lessen the responsibilities of the Ordnance Department. On April 29, 1919, the Secretary of War authorized the establishment of storage depots as depositories for the large quantities of war materials purchased or produced during the war and foreign equipment captured during the hostilities.

Aberdeen Proving Ground was designated a storage depot, and on May 5, 1919, orders were given for the construction of storage facilities. Twelve artillery sheds, each 96' x 400', were built, but material and vehicles began arriving before the facilities were completed on Mulberry Point Road. It was necessary to store the material in open fields. The Field Service was placed in charge of reconditioning, maintenance, and storage of the material awaiting testing and shipment. Nine of the original buildings still stand, and have been modernized.

Many of the vehicles and weapons that arrived at Aberdeen Proving Ground were of great interest, not only to visitors but also to students at the Ordnance School. Although most of the material was at the proving ground for testing, much of it was displayed at a large building that had been erected for assembly of vehicles and ordnance, building #314. This building was rebuilt from the foundations up, and is now TECOM Headquarters.



Aerial View of Plumb Point and Main Front  
Aberdeen Proving Ground, MD, April 14, 1932  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD

## NEW TEST FACILITIES AND MISSIONS

The period between the wars at the proving ground (1919-1940) brought with it a reduction in the amount of activity, but work by no means came to a halt. While there was a reduction in the quantity of munitions to be proved, there was a marked increase in the testing and development of new weapons and munitions. With the increase in testing and development, new facilities were needed to house these activities; also, there was a need for new and different testing facilities and ranges.

In 1921, the small arms ballistic range was constructed near the former town of Michaelsville. Responding to the increased research in the use of armor plating, a light armor plate range was constructed. With the realization of the military potential of aircraft, a Camera Obscura facility was added in 1922 for experimental studies of bomb trajectories. In 1935 a new automotive laboratory was completed and the existing automotive testing facilities expanded in 1937.

On July 1, 1935, a new division was established. The Research Division was an outgrowth of the old Range Firing Section of the Proof Department. The mission of this new division was to conduct basic ballistic research and development, devise firing tables and conduct experimental work on new forms of ballistics. The Gun Testing Division would need new quarters, and in 1939, plans were approved for a new facility; the Ballistics Research Laboratory, building #328, was completed in 1941.

The Ordnance Training School which had been established at Aberdeen Proving Ground in 1918 was one of several such schools operated by the Ordnance Department. In 1936, it was decided to consolidate all the various schools, and Aberdeen was chosen as the most desirable location for the new Ordnance Training School. Construction of the new facility was begun in 1938 and the buildings were completed in mid-1940.

## CONSTRUCTION 1919-1940

While new missions and activities were planned and implemented, many of the old temporary structures erected during the World War I mobilization were deteriorating at an alarming rate. Major newspapers carried articles concerned with the condition of these structures across the country. These buildings were somewhat primitive to begin

with, and had sometimes been left unpainted, hastening deterioration. Their wooden pier foundations were prone to rot and termite attacks.

The more violent forces of nature also took their toll of early buildings at Aberdeen Proving Ground. In 1919, an explosion in a TNT cooker destroyed four munitions magazines, the TNT shop, and a loading shed. This is sometimes referred to as the Great Trench Warfare Explosion. The resulting fire and explosions caused damage to many other buildings. In 1920, fire destroyed five one-story buildings on the Main Front. On June 25, 1924 a violent storm with tornado-like winds damaged many buildings, destroyed a number of observation towers, and a number of velocity towers were damaged.

As the population of the Proving Ground receded from the World War I high of five thousand military and three thousand civilian personnel, the need to retain all the structures built for the mobilization effort also receded. As stated, many of these temporary buildings were deteriorating. Those that were truly unneeded were taken down, and plans were made to maintain or reconstruct other buildings in a more permanent fashion. The 1920's saw very little new construction at Aberdeen Proving Ground, for military spending in general was sharply cut, and that allocated to construction was cut even more. The attitude in America was that there would no longer be any need for military construction, since they had just fought the "War to End All Wars".

With the inauguration of Franklin D. Roosevelt in March of 1933, monies for new military construction dried up. The new President even went so far as to impound monies appropriated by the former President, Herbert Hoover. However, Aberdeen Proving Ground was to escape many of these new budgetary cuts and was allotted almost three million dollars from the Federal Emergency Works Administration in November of 1933.

Monies allocated under the Federal Emergency Works Administration were to be used for permanent construction at Aberdeen Proving Ground. Twenty-eight officer's quarters and eighteen NCO quarters were built on Plumb Point and across from the Ordnance School. Construction also included barracks, supply buildings, quarters for Air Corps personnel, a firehouse (#300), guardhouses (#150), and a locomotive and crane house (#3011). Further allocations were forthcoming. On March 14, 1934, an additional \$200,000.00 from the Public Works Fund were given for the construction of additional

storage areas, a gas station (#340), storage garage, carpenter shop (#332), and two NCO quarters.

President Roosevelt's New Deal Programs were to have another effect on the Proving Grounds. The Civilian Conservation Corps Company 3320 was organized at Aberdeen Proving Ground in July 1935. The work of the Civilian Conservation Corps here was directed toward three major goals: correction of drainage and erosion problems inherent in a tidal region, construction of firebreaks, and clearing and construction of roadways. Some of their work is evident, especially in the Plumb Point area, where Civilian Conservation Corps shoreline work has helped preserve this area. The company was active at Aberdeen until the middle of 1938 when it was transferred to Tobyhanna, Pennsylvania. In addition to the Civilian Conservation Corps camp, the Federal Government also established a Federal Emergency Relief Administration Camp, which was active from June 1934 to November 1935. Some of their panelized buildings were later used for troop barracks, offices, etc.

In December 1935, the building which currently houses the Civilian Personnel Office (#305) was completed. This was originally the 44th Ordnance Company barracks, and contained not only sleeping and living quarters but a mess, pistol range, PX, and handball courts. This building and several constant-temperature magazines and firing towers were among those aforementioned buildings constructed from the Federal Emergency Works Administration allocation. Many existing structures were rebuilt in a permanent fashion or modernized using this money. Hundreds of jobs were provided by the CCC, PWA, and WPA at Aberdeen Proving Ground.

In 1938, two new barracks and an administration building for the Ordnance School were started. Funds for this complex came from the Public Works Administration. These buildings are nearly identical to the 44th Ordnance Company barracks, but differ only in entrances, porches and some dimensions.

#### WORLD WAR II MOBILIZATION

In 1939 the prospects for peace were almost totally eroded and plans were implemented to prepare the nation again for war. In accordance with these plans, Aberdeen Proving Ground underwent a period of physical expansion. Additional land towards the town of Aberdeen was acquired for the reservation and additional land near Churchville was

purchased for an automobile testing area. The public landing near Plumb Point was appropriated as well, although it was promised to be returned to the public after the war.

The expansion needed to serve the emerging conflict overseas was reflected at Aberdeen Proving Ground. The new facilities of the Ballistic Research Laboratory (BRL) and the Ordnance Training School were both finished in 1940-1941. In 1942 the Ordnance Board was created and permanently stationed at APG. The Ordnance Board's mission was to conduct studies and make recommendations to the Chief of Ordnance regarding new developments in the field of ordnance and weaponry.

As the missions of Aberdeen Proving Ground were broadened, it was obvious that there would be a tremendous increase in personnel required for completion of these missions and for training for the overseas conflict. Cantonment and support construction was begun at Aberdeen Proving Ground before our formal entry into World War II.

#### MOBILIZATION STANDARDIZED CONSTRUCTION

On December 1, 1941, the responsibility of construction for the United States Army passed from the Quartermaster Corps to the Corps of Engineers. The Corps of Engineers was somewhat better prepared to meet the demands of mobilization than had been the case in the First World War. During the period between the wars, the standardized construction series used for the first war, the "600 series", was revised and modernized. Although in many cases the earliest revisions were lost and had to be redrawn often from memory. The eventual product of these modernizations was the "700 series" designs. The "700 series" designs were used in the early phases of cantonment construction at Aberdeen Proving Ground and elsewhere.

The "700 series" building designs were supplanted by the improved "800 series" standardized designs, which were developed to meet the changing needs of the Army. Throughout the development of the series buildings, improvements were made in architectural and engineering design in an effort to make the buildings safer, more durable, and more useful. An economical construction was the primary reason for standardized construction.

200

One basic difference between the "700 and 800 series" was in relation to the size of troop barracks. Originally, barracks were meant to house 63 men each, to correspond to an infantry company size of 125. The overall layout and design of cantonments and cantonment buildings such as messes, hospitals and administration buildings, reflected this basic unit size. However, a change was made in this basic infantry company size: 125 to 217 men. The "800 series" plans for mobilization cantonment buildings reflected this unit size difference. Barracks were designed to have a 74 man capacity but had an option for construction to a 63 man capacity, if desired. The "800 series" mobilization buildings were used in the later phases of construction at Aberdeen Proving Ground, as their drawings were complete in the early summer of 1942. Today, buildings from both the "700 and 800 series" are still standing and in use at Aberdeen Proving Ground.

An addition was made to the Headquarters Building to accomodate the enlarged administrative staff. This addition was later demolished. More buildings were added to the Main Front area and other buildings were modernized.

#### POST WORLD WAR II ACTIVITIES

With the end of World War II, activities at Aberdeen Proving Ground were again reduced as the nation returned to a period of peacetime activity. However, as a result of the new highly mechanized and technological system of warfare, as well as the tense geopolitical situation, many of the existing research and experimental programs were continued. New programs and missions were added, and testing of allied and enemy ordnance and weaponry added to the Army's knowledge. Additional lands were again added to Aberdeen Proving Ground with the acquisition of Spesutie Island in 1945. Land had also been added in 1941-1942 with the expansion of the Proving Ground's western boundaries. The ongoing activity resulted in a reorganization of the old Proof Department into an organizational system more like the present system under DARCOM.

New facilities were added to Aberdeen Proving Ground again. The Range Fire Control had a new complex built in the late 1940's. Housing was built under the Wherry Act in the late 1940's and early 1950's to house enlisted men and their families.

The Korean War (1950-1953) brought with it a reactivation of many missions that had been discontinued following World War II, most notably the Ordnance Training Replacement Center which had been inactivated in 1947. The Ordnance Training

Command was reestablished in 1950 at Aberdeen Proving Ground to ensure the state of readiness of all Ordnance Company units.

The signing of the Peace Accords brought to an end active hostilities in the Korean War; however, work at the Proving Ground continued at an active pace. Operations within the Ballistics Research Laboratory were expanded. No longer were their activities restricted to work involved with the in-flight operation of projectiles, but they entered the field of computers, rocketry, space study, and satellite tracking and development. The ENIAC, one of the first digital computers acknowledged to be the foundation of modern computer technology, was used in BRL in 1947 to aid in computations, although the transistor's limitations kept the ENIAC from achieving its full potential.

Efforts to achieve a more efficient and harmonious relationship between man and machine were greatly increased with the establishment of the Human Engineering Laboratory (HEL) in 1952. Today this mission is housed in a new facility designed to assist the staff of engineers and psychologists in increasing our knowledge of the man-machine relationship.

In the mid-1950's and into the 1960's, the old cantonments from several of the blocks were replaced by more modern barrack complexes. Not all of the blocks of barracks were replaced, and two nearly complete blocks of WWII barracks remain today. The new barracks were more like a dormitory at a college, although there were 8 men or women to a room. The Army continued this policy of replacing older barracks with new ones and in 1981 another barracks complex was built. Those constructed in the 1950's and 1960's have been, and are being extensively remodeled, and plans are underway for more construction.

Until 1962, Aberdeen Proving Ground operated directly under the Chief of Ordnance, but in 1962 the Proving Ground was reorganized into its present form.

A new hospital was completed in 1962, last in a series of four hospitals: 1917, with additions made in 1919, 1933, and 1942, and the present Kirk Army Hospital. New barracks were constructed to house troops for the Vietnam War. These low, one-story buildings had much in common visually with the barracks built to house troops in the First World War.

In 1971, Aberdeen Proving Ground merged with Edgewood Arsenal, its neighbor to the west, and both installations were named Aberdeen Proving Ground -- Aberdeen Area and Edgewood Area.

## MILITARY HISTORY-EDGEWOOD AREA

### SITE DEVELOPMENT-WORLD WAR I

One special area that came under the jurisdiction of the Ordnance Department in World War I was chemical warfare. Since the Ordnance Department's mission was to procure all weapons necessary for fighting wars, chemicals came under their jurisdiction from the day that they were first used in the battle of Ypres, Belgium, in 1915. Very little information about the production and use of the chemicals involved in warfare was known here when the United States entered the Great War in April, 1917. The British and French Allies supplied as much information as they could to the Trench Warfare Section of the Ordnance Department under Lieutenant E. J. W. Ragsdale in Washington, DC. It was quickly decided that America, too, needed toxic chemical-filled projectiles in order to fight effectively with the Allies in Europe, and the race began to develop, produce, fill shells, and ship chemicals as soon as possible to the American troops in Europe.

A plan was devised to build a shell filling plant near good transportation routes to receive the chemical materials manufactured and shipped by private industry. The site chosen for this activity was located near Edgewood, Maryland, on the newly acquired Aberdeen Proving Ground site. This area was located near the Pennsylvania Railroad between Baltimore and Philadelphia and on the Bush River close to the Chesapeake Bay. Construction began on the first shell filling plant on November 1, 1917, on the part of the proving grounds then known as Gunpowder Neck Reservation.

It became obvious that the plan for shipping chemicals to the Gunpowder Neck Reservation would not fulfill the requirements of war. The four major chemicals used in World War I were chlorine, chlorpicrin, phosgene, and mustard gas. None was in wide use in the United States. Only chlorine and a small amount of phosgene were being commercially produced here. Moreover, the private sector was reluctant to start producing the chemicals because of the extensive research needed to devise quantity and quality methods of manufacture, the danger inherent in the chemicals themselves, and the short-lived value of production. After the War, toxic chemical plants would be essentially useless. A further deterrent to the plan for offsite production was a ruling by the Director General of Railroads stating that all toxic materials had to be shipped by

special train. This dramatically increased the costs of shipping. By December, 1917, the plan for the Gunpowder Neck Reservation was revised to include the proposed chemical production facilities directly at the site. Construction began immediately.

The first two manufacturing plants to be constructed were the chlorpicrin plant and the phosgene plant. Chlorpicrin, a lethal tear agent, was used by itself or mixed with other gases. The plant was completed and in production by June, 1918. Phosgene, a lethal choking agent, became responsible for more than eighty per cent of World War I chemical agent fatalities. The phosgene plant, begun in March, was ready for production by July, 1918. Other chemicals determined necessary for war were mustard gas and chlorine.

Mustard gas, a blistering agent, had been first used by the Germans in July, 1917. American military experimenters worked hard trying to devise safe methods for its manufacture at the Gas Service's American University Camp in Washington, DC, and at private and other government research facilities throughout the East and Midwest. After much experimentation, researchers felt sufficiently knowledgeable and confident enough to begin large scale manufacture in April, 1918. It had already been decided to erect a mustard gas producing plant at the Gunpowder Neck Reservation, but construction was delayed until the process had been determined safe enough. Construction began in May, 1918; production commenced in June. It was the only mustard gas plant in actual production by the end of the war.

Chlorine was the only chemical used in World War I that had been produced commercially in any quantity in the United States before the war. It was a basic ingredient in the manufacturing processes of other chemicals. Not surprisingly, the commercial quantity fell far short of war time needs. On May 11, 1918, ground was broken for a new chlorine plant at the Gunpowder Neck Reservation. It was designed and constructed by the Samuel M. Green Company of Springfield, Massachusetts, using the electrolytic apparatus of the "Nelson Cell". When completed, it was the largest single chlorine and caustic soda plant in the country. Although operational by August, actual production began in September, 1918.

By its commitment to chemical production at Edgewood, the Army succeeded in interesting some private firms located in the East and Midwest to manufacture more of the needed chemicals. The Army agreed to pay for the construction costs of five

chemical manufacturing plants while private companies operated them. Another four plants were both owned and operated by the Army.

The increased importance of chemicals in warfare was reflected in changes of the organizational structure dealing with chemicals throughout 1918. Originally under the jurisdiction of the Trench Warfare Section of the Ordnance Department, the various chemical activities were soon organized into one separate bureau in the Ordnance Department under the administration of Colonel William H. Walker in January, 1918. On May 4, 1918, General William L. Sibert, Director of the Gas Service, took charge of the activities at the Gunpowder Neck Reservation. At that time, the name changed to the Edgewood Arsenal. In June, the Edgewood Arsenal became the center for the newly created Chemical Warfare Service. This entity, now entirely separated from the Ordnance Department, was charged with the responsibility for research, development, supply, and manufacture of all offensive and defensive items in the chemical warfare field, including chemicals themselves, projectiles, and gas masks.

Throughout 1918, Edgewood Arsenal continued to grow. What had been farmland in the fall of 1917 was rapidly transformed in less than one year. By October 1, 1918, 558 buildings had been constructed including the following: 86 cantonments housing 8,500 men, 5 officers' barracks for 290 men, a hospital unit of 34 buildings with a 420-man capacity, administration buildings, a 40-man chemical laboratory, 1 chlorpicrin plant, 1 phosgene plant, 1 mustard gas plant, 1 chlorine plant, and 2 shell filling plants. Fifteen miles of improved roads, 21 miles of standard gauge railroad, and 15 miles of narrow gauge railways were also constructed. Three power houses and 2 water systems providing 9.5 million gallons of salt water and 2 million gallons of fresh water a day were successfully installed.

In the construction of Edgewood, the Army realized that it was making a permanent commitment in terms of time, materials, and human lives. Safety and security were primary concerns throughout the construction and production history of Edgewood. All the plants were constructed solidly, with the most up-to-date equipment that the technology of the time could produce. The buildings were well ventilated and mechanized to their maximum capacity in order to minimize human accidents. This concern for safety and security extended even to the men employed at Edgewood. Although civilian labor was used to construct the arsenal, the Army decided that, because of the potential dangers, operations would be entirely managed by enlisted men.

The men stationed at Edgewood were non-rotating troops for the most part. Their contribution to the war effort was in their manufacturing activities. Their lives at Edgewood were similar to most other bases. There were Y.M.C.A. facilities, baseball diamonds, Knights of Columbus meeting halls, and a fine athletic field with running tracks. There were also assembly halls with "moving picture machines" and a forty-two piece band made up of men from the plants. A major difference between the barracks at Edgewood and those at Aberdeen was the fact that the ones at Edgewood were constructed out of structural clay tile rather than wood. Although life at Edgewood may have seemed easier than being sent overseas, the danger of the situation was very real. During the manufacturing operations in 1918, there were 925 casualties; only four of which were fatal: three people died of phosgene poisoning, and one, of mustard gas.

When the Armistice was declared on November 11, 1918, chemical production at Edgewood Arsenal stopped. The gas plants and the shell filling plants became silent. An inventory of the manufacturing facilities at the arsenal showed it capable of the following output:

<u>Facility</u>	<u>Daily capacity</u>
Chlorine and caustic soda plant, including chlorine plant of Nelson cells	100 tons
Caustic soda evaporation and concentration plant	116 tons
Chemical plants including:	
Sulphur chloride plant	40 tons
Liquid chlorine plant	100 tons
Phosgene plant	80 tons
Chlorpicerin plant	22 tons
Mustard gas plant	100 tons
Shell filling plants, including:	
Plant for 75 mm. shells	33,000 rounds

Plant for 75 mm. and 4.7-in. shells	25,600 rounds
Plant for 115 mm. and 6-in. and 8-in. shells	20,000 rounds
Plant for 9.2-in. and 240 mm. shells.	under construction
Plant for filling gas grenades	20,000 rounds
Plant for filling smoke grenades	20,000 rounds
Plant for filling smoke shells	700 rounds
Plant for filling incendiary drop bombs	2,000 rounds
Plant for filling Stokes mortar bombs with smoke material	6,300 rounds
Plant for filling Livens projectiles	1,200 rounds

Often, however, the manufacturing capabilities did not match the actual production. Mustard gas was only being produced at thirty tons a day because of changes in its method of production. The phosgene plant produced twenty tons of its eighty tons a day capability. For the shell filling plants, chemical production outstripped the supply of shells and boosters needed to assemble the projectiles. There were also shortages of shell supplies which hampered the assembly and shipment of weapons overseas.

World War I was a significant beginning for Edgewood Arsenal. The construction and the production capabilities of four major chemical plants erected on one site in one short year represented an achievement in the cooperation among the military, industrialists, research chemists, and construction engineers. From knowing nothing, the United States had become a leader in the chemical warfare field by the end of the War. World War I created a need for chemical warfare which the military establishment decided to

answer. In order to do a good job, the military recruited top research chemists from both universities and industry. Working in various research laboratories, these chemists experimented with the chemical reactions, improved on them, and readied them for production. Then on a site and with money given by the military; chemists, industrialist, engineers, and the military watched the transformation of experimental processes into actual machinery and buildings capable of producing tons of chemicals a day. It was a massive enterprise, successfully completed. Although several other plants were being constructed, Edgewood Arsenal was the largest production facility and the only one to produce all four chemicals used in World War I. It became a complex so efficient that production at Edgewood Arsenal was more effective than either of the Allies. At the end of World War I, it was reported that even the German chemical plants were copying American methods.

A suprising number of World War I buildings remain at Edgewood. The actual machinery no longer exists in the structures; it has been removed over the years as the mission of Edgewood Arsenal has changed. None of the original chemical plants remain intact, but there are representative remnants of them. Four buildings constructed as the phosgene plant (#E5354, #E5352, #5360, and #E5357) and two from the mustard gas plant (#E5440 and #E5452) still remain. The chlorine liquification plant building (#E5325) still stands, but nothing of the highly praised 1918 chlorine and caustic soda plant remains. A 1918 white phosphorous plant (#E5032) still stands along with its storage magazines (#E5044 and #E5046). In the assembly plant area, the original generating and heating plant (#E5126) stands as well as the three original shell dumps (#E5158, #E5165, #E5179). One of the comp houses (#E5137) and one storehouse of boosters and adaptors (#E4060) remain. Some auxiliary buildings such as a well house, two fire stations, a change house, and several magazines also stand. Other areas surviving from World War I include a 1918 barracks complex, an officers' mess and guest house, and part of the original hospital and administration area. The buildings built during World War I, particularly those built in the industrial area, were built for specific purposes and inherent in those purposes, was a need for keeping technology and production facilities as up-to-date as possible. Those buildings which could be adapted to fill new discoveries were so adapted; those that had outlived their purposes were demolished. The Chemical Warfare Service was proud of its World War I record and looked towards future service as a vital part of national defense.

## POST-WORLD WAR I ACTIVITY

After November, 1918, the Chemical Warfare Service and Edgewood Arsenal faced a sharp role change. What had seemed a natural and necessary response in war time, seemed inhuman and unconscionable in peace time. Statistics that the Chemical Warfare Service had been proud to publish right after the war, became monstrous to a public reeling under the horrors of war. Instead of receiving accolades for a job well done, the Chemical Warfare Service found itself desperately trying to justify its existence and its record both in terms of the morality of chemical warfare and its firm belief that chemicals would be a vital part of any war fought in the future.

This struggle was again reflected in organization changes. Immediately after the Armistice, the Chemical Warfare Service reverted to the jurisdiction of the Ordnance Department. In 1920, it gained permanent status and was established as a separate branch of the Army. Its peacetime instructions were to maintain "a competent body of chemical warfare specialists with facilities for continuous research and experimentation" and to keep "in touch with civilian agencies for chemical research and chemical industries capable of being converted for the production of wartime material." However, funding was cut sharply and the organization was forced to limit its role.

The far flung activities of the Chemical Warfare Service were concentrated at its headquarters, Edgewood Arsenal. The offsite chemical manufacturing plants were dismantled and returned to peacetime use. The machinery used in the gas mask plant located on Long Island during the war was dismantled, shipped to Edgewood, and installed in a new building. The testing done at the chemical proving grounds at Lakehurst, New Jersey, was halted and the testing functions consolidated at Edgewood. The Chemical Warfare School originally located at Lakehurst, New Jersey, was also transferred to Edgewood. The actual chemical plants at Edgewood were placed on stand-by readiness status. All was in readiness in case of a new conflict.

In the climate of censure concerning the use of chemical agents, readiness for any new conflict was not a valid argument for the existence of a Chemical Warfare Service to opponents who claimed that the war to end all wars had just been fought. Instead, the Chemical Warfare Service emphasized the peace applications of their chemical research. Inventing a better gas mask and protective clothing were always important ongoing research projects. Not only would such protections be necessary for any future

war, but they also were useful accident prevention devices for private industry. Other military research and development projects included dispersion of chemical agents from airplanes, smoke-producing materials for smoke screens, Livens Projectors, and the .2 inch chemical mortar. Yet, the most highly publicized work of the Chemical Warfare Service during peacetime included combating marine borers, boll weevils, barnacles, and rats possibly carrying Bubonic Plague on immigrant ships.

In 1922, Edgewood Arsenal was subdivided by General Order #40, giving part to the Ordnance Department for the creation of Fort Hoyle for the Sixth Field Artillery. Fort Hoyle, named in honor of Brigadier General Eli D. Hoyle, and the Chemical Warfare Service co-existed peacefully in the World War I barracks that still exist at the southern part of Edgewood. When World War II broke out, the Sixth Field Artillery moved on to the battle and the Chemical Corps reclaimed its original territory.

Very little new construction was accomplished at Edgewood Arsenal between the Wars. The actual manufacturing plants, which had been placed on stand-by readiness status, gradually fell into disrepair. There was no massive Work Projects Administration (WPA) sponsored permanent construction at Edgewood as there was at Aberdeen Proving Ground. Some officers housing was built during the 1920's; it was all wood frame and shared by officers from both the Chemical Warfare Service and Fort Hoyle. During the 1930's, standardized Quartermaster house plans, exactly the same as one type at Aberdeen Proving Ground in the Plumb Point region, were built out of brick. One other permanent construction was the Fort Hoyle Riding Hall built in 1938 out of Port Deposit Granite. It was converted to a gymnasium in 1941.

## WORLD WAR II ACTIVITY

In preparation for possible conflict during the prelude to World War II, the Chemical Warfare Service was infused with money because it feared that gas would be used again. Toward the end of the 1930's, the Chemical Warfare Service gained approval for reopening its mustard gas manufacturing plant at Edgewood Arsenal for limited production. As rumors of war increased, the phosgene and chlorine plants underwent major rehabilitation. New plants were constructed. Among these were the World War II Adamsite Plant, a cyanide plant, and a  $\text{CCl}_2$  (a chemical for protective clothing) plant. With production facilities expanded, more storage space was needed. The storage depot was expanded with new structural clay tile magazines and Transite-sided warehouses.

The eastern part of Edgewood Arsenal became designated as the Eastern Chemical Depot, the first and only chemical storage facility on the East Coast. More storage facilities filled the western sector of Edgewood. Several new chemical shell filling plants were built.

As activity increased, so did personnel. New cantonments were constructed in late 1940 and early 1941. These were temporary wood buildings constructed following the earlier 700 series standardized mobilization plans. Monies were also approved for the construction of a major new chemical laboratory.

Until the laboratory was completed in 1942, the research functions of the Chemical Warfare Service were scattered throughout the country in any research facility that was offered to it. Throughout the War, as the functions of the Chemical Warfare Service expanded, Edgewood Arsenal was no longer large enough to encompass all activities. It became the headquarters and was redesignated the Chemical Warfare Center in 1942. New chemical plants owned and operated by the Army were constructed in the South and West. The Chemical Warfare Service remembered that the private sector would not produce the toxic materials needed for war; it was easier to produce the chemicals themselves. As Edgewood proper became too small for chemical testing, a new proving ground was established out West. Four other chemical depots were set up in various regions of the country. With newer arsenals undertaking the major chemical production functions, the role of Edgewood became oriented less towards actual chemical production and more towards administration, research and development, limited testing, and production of experimental chemical agents in small pilot plants.

#### POST-WORLD WAR II ACTIVITY

With the end of World War II, the Chemical Warfare Center continued to serve as headquarters for the Chemical Corps and was redesignated as the Army Chemical Center. The Chemical Corps remained strong although chemical warfare had not been used on the battlefields as it was during World War I. Moreover, the prevailing philosophy was that a strong offense on the part of the United States was the safest security against such use. Therefore, research was conducted on nerve agents and their dissemination, but also much work was conducted on protective measures. The forerunner of the United States Environmental Hygiene Agency was established to study

the effects of agents and the newest problems of radiation and radiological fallout. Other research was continued on napalm, flame throwers, herbicides, and screening and signaling smokes.

In 1951, the Chemical Corps was reorganized into a three command structure. The Headquarters, Research, and Engineering Command was established at the Army Chemical Center. It had control over all research and engineering installations and activities of the Chemical Corps. The Chemical Warfare School was placed in the Chemical Corps Training Command and its activities were transferred from Edgewood to Fort McClellan, Alabama. In 1962, the general reorganization of the Army resulted in the redesignation of the Army Chemical Center back to Edgewood Arsenal. On July 1, 1971, Edgewood Arsenal became a part of Aberdeen Proving Ground and its mission functions became those of a Class II Activity under the United States Army Munitions Command.

Since World War II, new construction at Edgewood Arsenal has included new laboratories and administration buildings for various agencies such as, The United States Army Environmental Hygiene Agency (1967), The Ralph J. Truex Laboratory (1968), Veterinary Medicine (1979), and the United States Army Medical Research Building (1968). These show the shift at Edgewood Arsenal away from production and towards administration and research. Another area of new construction has been Wherry Housing (1951), new enlisted men's barracks (1962), and bachelor officers' quarters (1969), along with such support facilities as a chapel (1963), dispensary (1963), and enlisted men's service club (1960). Aside from new construction, older buildings have been rehabilitated and altered in the continuing quest of remaining modern in order to fulfill a mission. It is now a military policy that the United States will not use chemical and biological agents first in any military action, but will retaliate if fired upon. Thus, Edgewood Arsenal still serves a vital mission in the military establishment today and will continue its function in the future.

Chapter 3  
PRESERVATION RECOMMENDATIONS

BACKGROUND

Army Regulation 420-40 requires that an historic preservation plan be developed as an integral part of each installation's planning and long range maintenance and development scheduling.<sup>1</sup> The purpose of such a program is to:

- . Preserve historic properties to reflect the Army's role in history and its continuing concern for the protection of the nation's heritage.
- . Implement historic preservation projects as an integral part of the installation's maintenance and construction programs.
- . Find adaptive uses for historic properties in order to maintain them as actively used facilities on the installation.
- . Eliminate damage or destruction due to improper maintenance, repair, or use that may alter or destroy the significant elements of any property.
- . Enhance the most historically significant areas of the installation through appropriate landscaping and conservation.

To meet these overall preservation objectives, following general preservation recommendations set forth below have been developed:

Category I Historic Properties

All Category I historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for nomination regardless of age. The following general preservation recommendations apply to these properties:

- a) Each Category I historic property should be treated as if it were on the National Register, whether listed or not. Properties not currently listed should be nominated. Category I properties should not be altered or demolished. All projects on Category I historic properties should be done in accordance with Section 106, and Section 110F of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800).
- b) An individual preservation plan should be developed and put into effect for each Category I historic property. This plan should delineate the appropriate restoration or preservation program to be carried out for that property. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above referenced ACHP regulations. Until the historic preservation plan is put into effect, Category I properties should be maintained in accordance with the recommended approaches in the Secretary of Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings and in consultation with the State Historic Preservation Officer.<sup>2</sup>
- c) Each Category I historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.<sup>3</sup> When no adequate architectural drawings exist for a Category I property, it should be documented in accordance with Documentation Level I of these standards. In cases where standard measured drawings are unable to record the significant features of a property or technological process, interpretive drawings should be prepared.

### Category II Historic Properties

All Category II historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for nomination regardless of age. The following general preservation recommendations apply to these properties:

- a) Each Category II historic property should be treated as if it were on the National Register, whether listed or not. Properties currently listed should be nominated. Category II historic properties should not be altered or demolished. All projects on Category II historic properties should be done in accordance with Section 106 and Section 110F of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in "Protection of Historic and Cultural Properties" (36 CFR 800).
- b) An individual preservation plan should be developed and put into effect for each Category II historic property. This plan should delineate the appropriate preservation or rehabilitation program to be carried out for the property or for those parts of the property which contribute to its historical, architectural, or technological importance. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above referenced ACHP regulations. Until the historic preservation plan is put into effect, Category II historic properties should be maintained in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings and in consultation with the State Historic Preservation Officer.<sup>4</sup>

- c) Each Category II historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.<sup>3</sup>

#### Category III Properties

The following preservation recommendations apply to Category III historic properties:

- a) Category III properties not listed on or eligible for nomination to the National Register as part of a district or thematic group should be routinely maintained. Such properties should not be demolished, and their facades, or those parts of the property that contribute to the historical landscape should be protected from modification. If the properties are unoccupied, they should, as a minimum, be maintained in stable condition and prevented from deteriorating.
- b) Category III historic properties listed on or eligible for nomination to the National Register as part of a district or thematic group should will be treated in accordance with Sections 106 and 110F of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800). Such properties should not be demolished and their facades, or those parts of the property that contribute to the historical landscape, should be protected from major modifications. Preservation plans should be developed for groupings of Category III historic properties within a district or thematic group. Such plans should be limited in scope to those parts of the property which contribute to its importance.

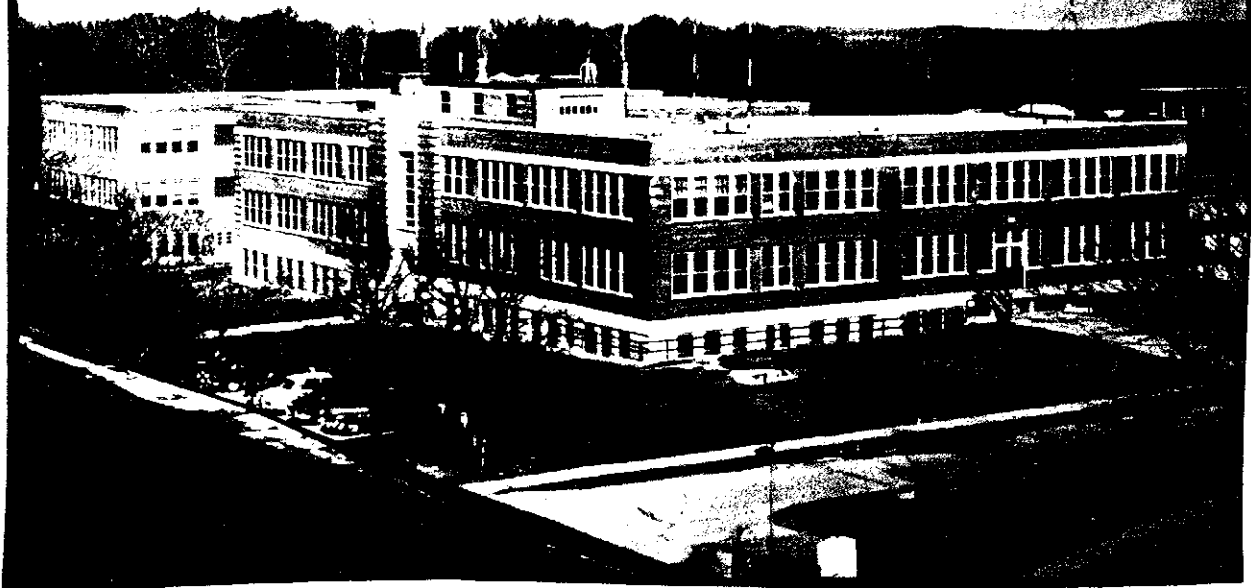
- c) Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level IV has been completed for all Category III properties, and no additional documentation is required as long as they are not endangered. All Category III historic properties that are endangered for operational or other reasons should be documented in accordance with HABS/HAER Documentation Level III, and submitted for inclusion in the HABS/HAER collections in the Library of Congress.<sup>6</sup> Similar procedures need only be documented once.

#### CATEGORY I PROPERTIES

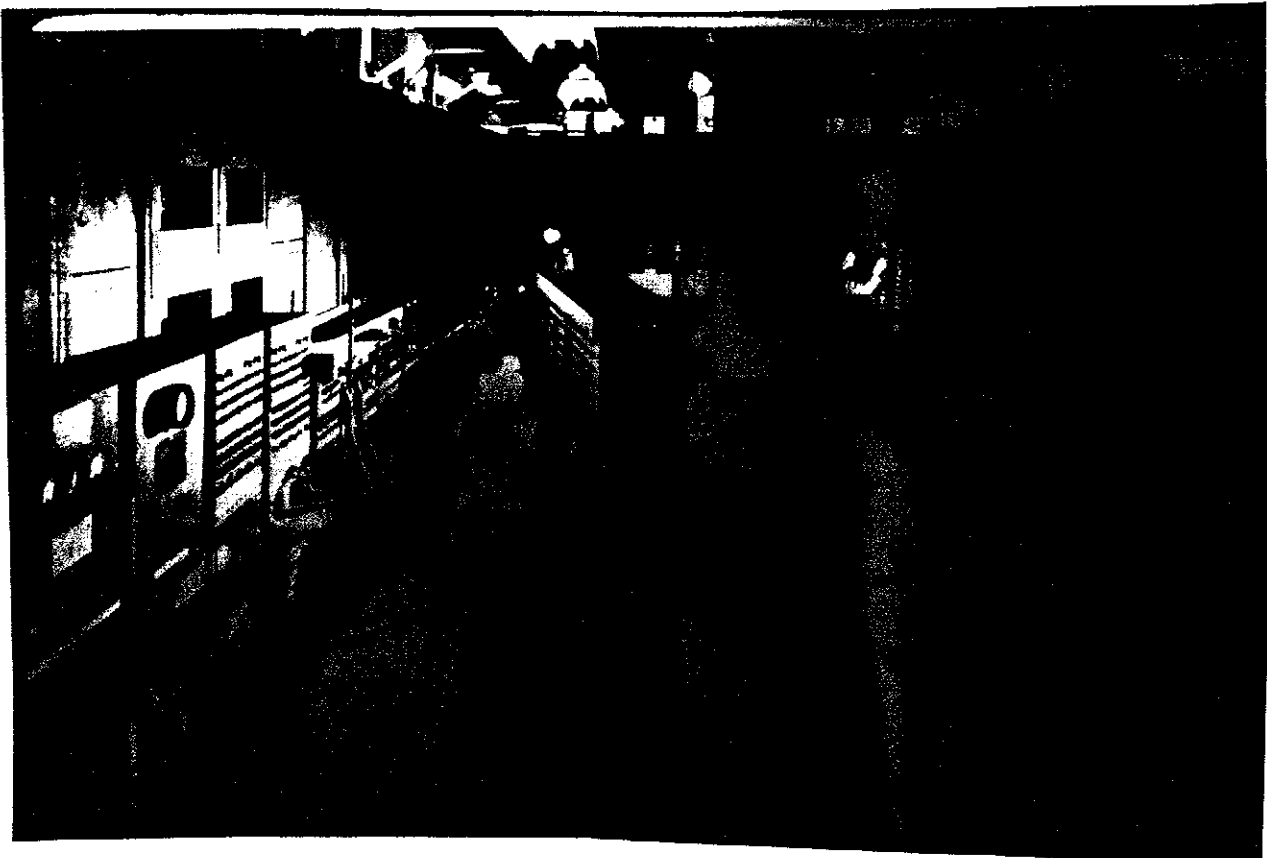
##### ABERDEEN AREA:

##### Ballistics Research Lab (Building #328)

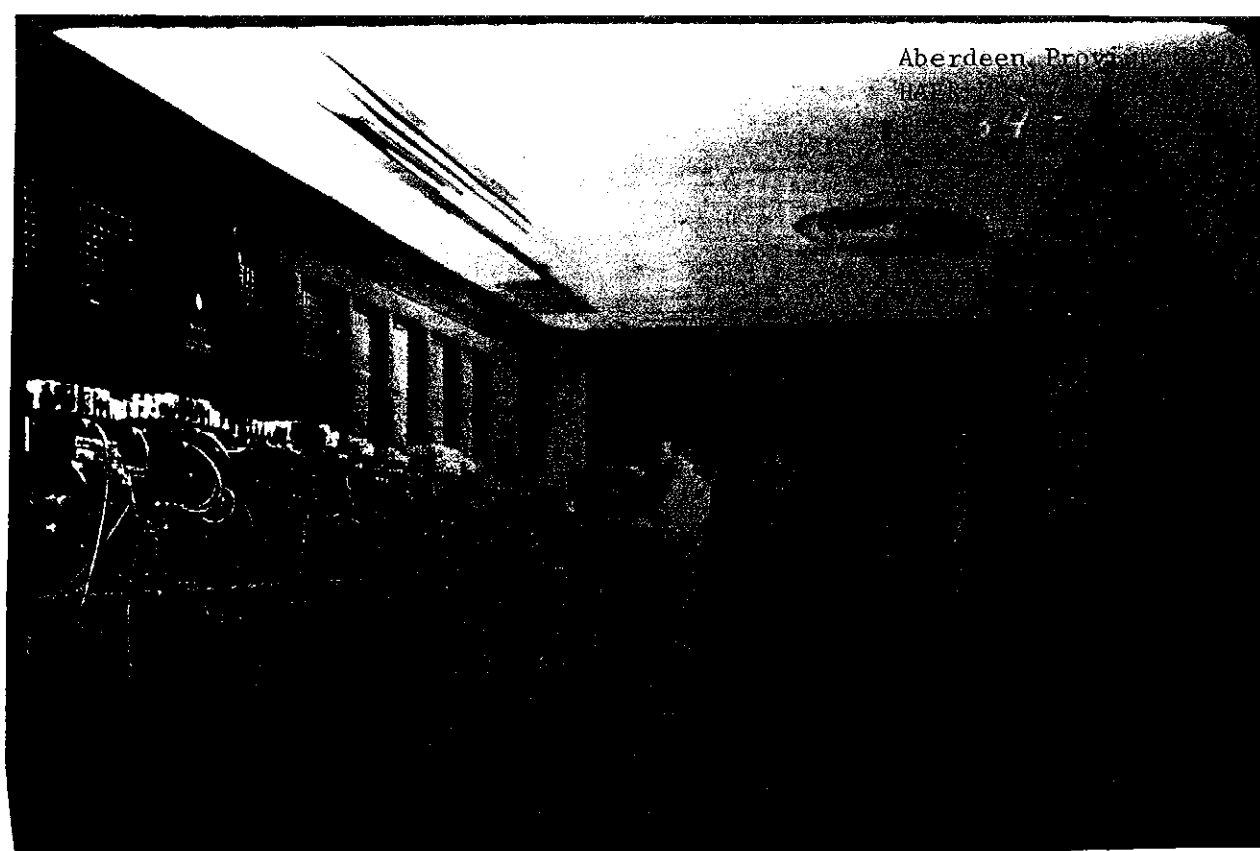
- . Background and significance. The Ballistics Research Lab is the U.S. Army's major experimental, developmental, testing and evaluation center for all ballistic matters. This includes small personal weapons as well as the largest military howitzers. The BRL's major historic achievement is that it was the home of the first electronic digital computer known as ENIAC. Originally designed and constructed at the University of Pennsylvania in 1945, ENIAC was installed in a specially built wing at Building #328 in 1947 (the main building was constructed in 1941). ENIAC was the prototype from which most other modern computers evolved and was operated at the BRL until 1955. It was used for the computation of major scientific problems such as ballistics tables, weather prediction, wind tunnel design, atomic energy calculations, and many other scientific uses.
- . Condition and potential adverse impact. This building is in excellent condition and no adverse impacts are known at this time.



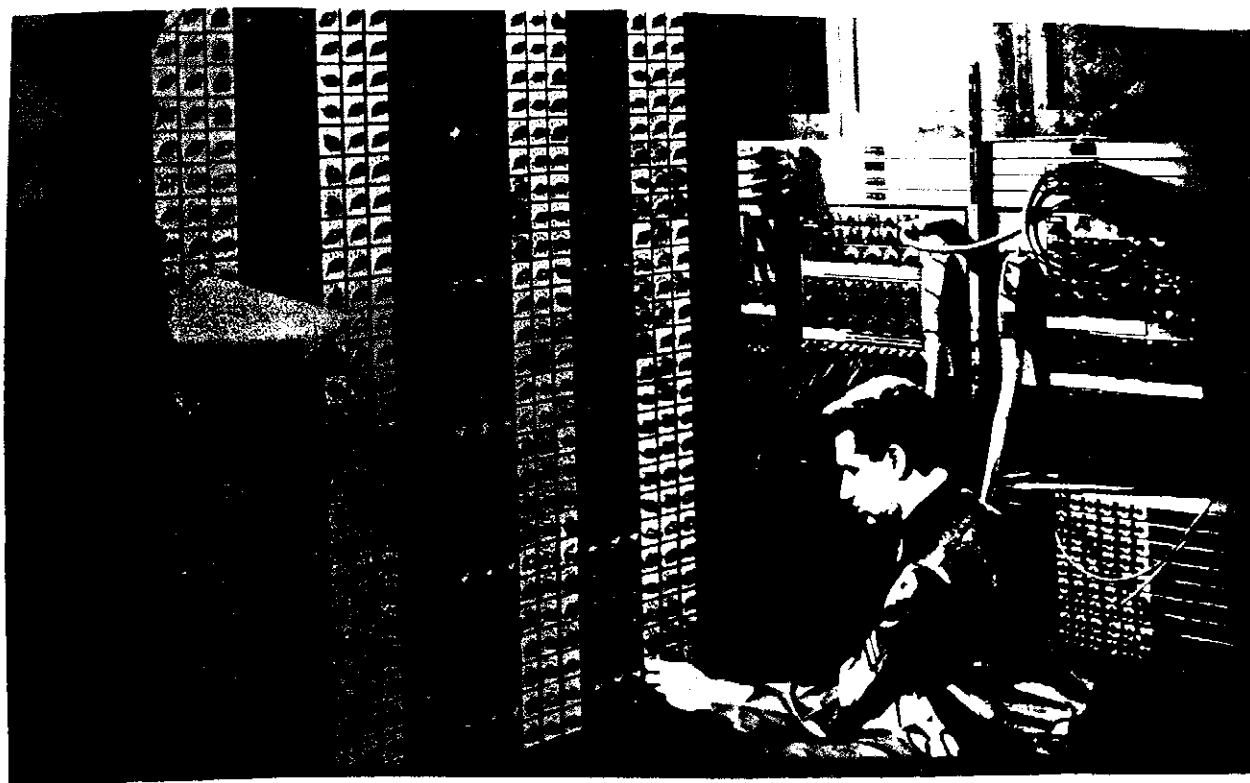
Ballistics Research Laboratory, ENIAC wing at left (Bldg. #328)  
Aberdeen Proving Ground, MD, ca. 1955  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD



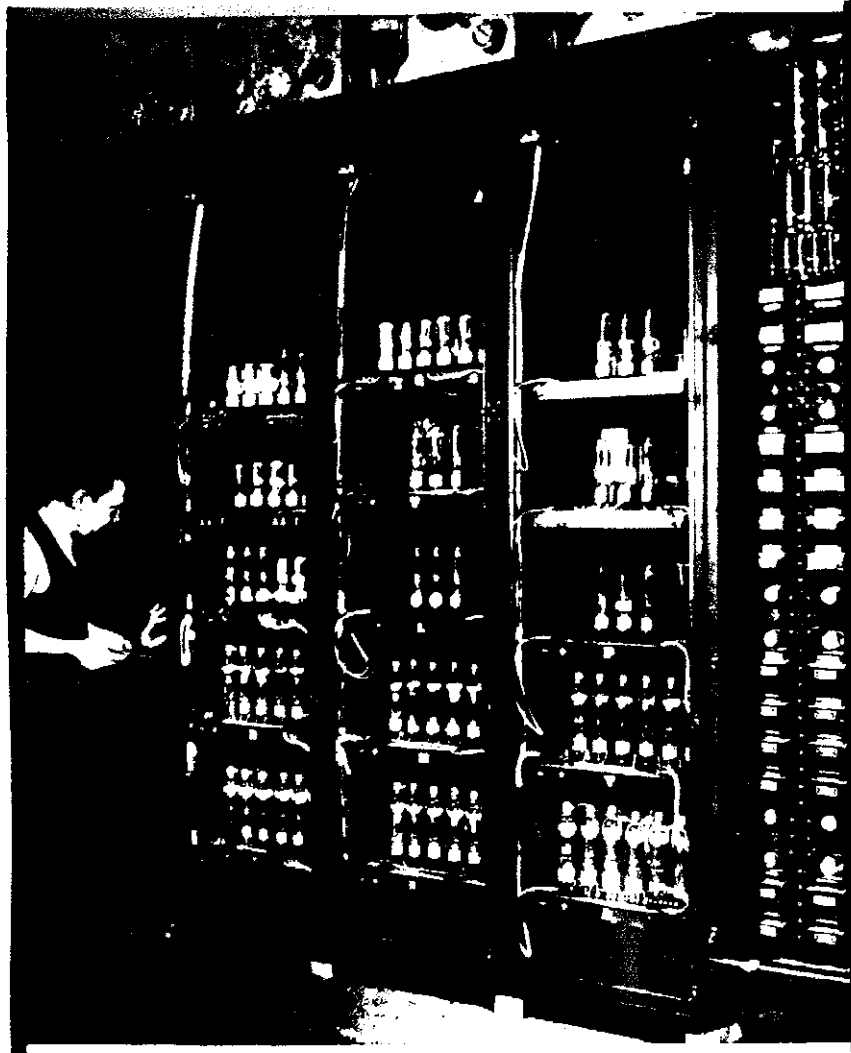
Ballistics Research Laboratory, ENIAC (Electronic Numerical Integrator and  
Computer), Aberdeen Proving Ground, MD, ca. 1948  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD



Aberdeen Proving Ground, MD, 7/7/48  
 Ballistics Research Laboratory, ENIAC, Aberdeen Proving Ground, MD, 7/7/48  
 Source: TECOM Historical Office, Aberdeen Proving Ground, MD



Ballistics Research Laboratory, ENIAC (Electronic Numerical Integrator and Computer), Aberdeen Proving Ground, MD, ca. 1948  
 Source: TECOM Historical Office, Aberdeen Proving Ground



Ballistics Research Laboratory, ENIAC, Power Supply Tubes,  
Aberdeen Proving Ground, MD, ca. 1948  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category I properties.

EDGEWOOD AREA:

There are no Category I properties in the Edgewood Area.

CATEGORY II PROPERTIES

ABERDEEN AREA:

Quarters One (Building #1)

- . Background and significance. This house is one of a few pre-Army buildings retained by the Army after the land was taken over for the Proving Ground. It reflects the type of land use and architecture that existed before the Army's arrival in 1918. The original construction date for this building is unknown. This has been the Commanding Officer's residence since then continuously, except for a period in 1934-5 when a large portion of the original house was demolished and the stone portion built to conform with the new houses nearby on Plumb Point. This new part was built using Federal Emergency Works Funds and PWA/WPA labor.
- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Chapter II properties.

Hospital (Bachelor Officers' Quarters) (Building #45)

- . Background and significance. Built in 1932 this building was originally the post hospital, replacing the old temporary WWI

hospital sited nearby. Fine workmanship, design and detailing distinguish this building.

- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Hopkins House (Family Housing-Colonel) (Building #84)

- . Background and significance. This house is one of a few pre-Army buildings retained by the Army after the land was taken over for the Proving Ground. Constructed at an unknown date, the house reflects the type of land use and architecture that existed here before the Army's arrival in 1918. It is still being used as a residence although it was moved in 1918 from its original site on the Main Front to its present location.
- . Condition and potential adverse impacts. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

H.R. Kent Supersonic Wind Tunnel and Laboratory (Building #120)

- . Background and significance. Constructed in 1944, this building contains the most effective and efficient supersonic and hypersonic wind tunnels used for research during and after WWII,

the first of their kinds. These tunnels enabled researchers to test under the proper conditions with sufficient duration and greater ease. This enabled them to develop many different weapons and other achievements. This is important in national military history and also in an engineering history.

- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Troop Barracks (Civilian Personnel Office) (Building #305, similar buildings: #3071, 3072 and 3073)

- . Background and significance. Constructed in 1934 this building is an example of standardized buildings of the New Deal Era built with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material alternates and were altered for different conditions. The design was intended to reflect regional architecture. Building #305 and Buildings #3071, 3072 and 3073 comprise the U.S. Army Ordnance School, the central school of its type in the nation. Many officers of our Army and foreign armies have come here for training since the school's founding.
- . Condition and potential adverse impacts. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Post Headquarters (Building #310)

- . Background and significance. Built in 1918 by the Construction and Service Division of the Quartermaster Corps this two-story wood frame and brick structure was renovated in 1934 and had a temporary wood addition of equal or greater square footage directly next to it during 1941-1945. Retains 1918 configuration and appearance despite modifications.
- . Condition and potential adverse impact. This structure is in good condition and is slated for demolition with the exception of the first bay.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category I properties.

Poole's Island Lighthouse (Building #816)

- . Background and significance. Constructed ca. 1830, Poole's Island Lighthouse is a significant cultural resource. It is one of thirty-two structures remaining of seventy-four lighthouses built by the Federal Government in the 19th century in an attempt to provide Aids to Navigation in the Chesapeake Bay. The architect also designed and built the Concord Point Lighthouse at Havre de Grace, Maryland, which is on the National Register of Historic Places and virtually identical to the Poole's Island Lighthouse.

The Concord Point Lighthouse is the only known lighthouse identical to the Poole's Island Lighthouse. Nine oil lamps originally lit the beacon, but were replaced by a fifth order Fresnel lens.

- . Condition and potential adverse impacts. This structure is in deteriorated condition due to vandalism, water deterioration, rust and plant growth and is considered a potential safety hazard.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Malcolm Mitchell House (Building #5650)

- . Background and significance. This house is one of a few pre-Army buildings retained by the Army after the land was taken over for the Proving Ground. Constructed at an unknown date, it reflects the type of land use and architecture that existed here before the Army's arrival in 1918. It is still being used as a residence.
- . Condition and potential adverse impact. This structure is in good condition and falls under the Army's order for temporary building removal.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

EDGEWOOD AREA:

Post Headquarters (U.S. Army Environmental Hygiene Agency Annex)  
(Building #E-1675)

- . Background and significance. This building was constructed as the center of the administration of Edgewood Arsenal during World War I and served as Post Headquarters until Edgewood Arsenal was administratively combined with Aberdeen in 1971.

- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Presbury House (Quiet Lodge) (Building #E-4630)

- . Background and significance. Constructed during the 18th century, this building possesses significance as an example of the pre-military land use of this area. It is also significant because of its early association with the Methodist Church as "Presbury's Preaching House."
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

White Phosphorus Processing Plant (Building #E-5032)

- . Background and significance. Originally built in 1918, this building represents the response of the United States to the use of chemical weapons during World War I. This structure is part of the remainder of the largest chemical manufacturing complex built in the United States and is critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place. This building housed the production of white phosphorus used in filling hand grenades.

- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Chlorine Liquification Plant (Asbestos Grinding Plant) (Building #E-5325)

- . Background and significance. Originally built in 1918, these buildings represent the response of the United States to the use of chemical weapons during World War I. This structure is the remainders of the largest chemical manufacturing complex built in the United States and is critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place. This building housed the chlorine liquification plant, capable of producing 100 tons a day.
- . Condition and potential adverse impact. This structure is in fair condition and is slated for demolition.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Oxygen Dryer for Phosgene Plant (Dispatch Office) (Building #E-5352)

- . Background and significance. Originally built in 1918, this building and Building #E-5354 represent the response of the United States to the use of chemical weapons during World War I. This structure is part of the remainder of the largest chemical manufacturing complex built in the United States and is critical

to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place. This building was used in the production of phosgene. By the time of the Armistice, this plant was producing 20 tons a day of its judged capability of 80 tons a day.

- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Oxygen Dryer for Phosgene Plant (Combination Vehicle Plant)  
(Building #E-5354, similar building: #E-5352)

- . Background and significance. Originally built in 1918, this building and Building #E-5352 represent the response of the United States to the use of chemical weapons during World War I. These structures are the remainders of the largest chemical manufacturing complex built in the United States and are critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place. These buildings were used in the production of phosgene. By the time of the Armistice, these plants were producing 20 tons a day of their judged capability of 80 tons a day.
- . Condition and potential adverse impact. These structures are in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Mustard Gas Plant (Irritant Munitions Plant) (Building #E-5440)

- . Background and significance. Originally built in 1918, this building represents the response of the United States to the use of chemical weapons during World War I. This structure is part of the remainder of the largest chemical manufacturing complex built in the United States and are critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place. This is a remnant of the mustard gas plant, the only one in the U.S. in actual production at the time of the Armistice.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Mustard Gas Plant (Detection Item Facility) (Building #E-5452)

- . Background and significance. Originally built in 1918, this building represents the response of the United States to the use of chemical weapons during World War I. This structure is part of the remainder of the largest chemical manufacturing complex built in the United States and is critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place. This is a remnant of the mustard gas plant, the only one in the U.S. in actual production at the time of the Armistice.
- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Mustard Redistillation Plant (Experimental Process Plant)  
(Building #E-5476)

- . Background and significance. Originally built in 1918, this building represents the response of the United States to the use of chemical weapons during World War I. This structure is part of the remainder of the largest chemical manufacturing complex built in the United States and is critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place.
- . Condition and potential adverse impact. This structure is in deteriorated condition and is slated for demolition.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Pilot Plant (Buildings #SE-5481 and E-5487)

- . Background and significance. Originally built in 1918, these buildings represent the response of the United States to the use of chemical weapons during World War I. These structures are part of the remainder of the largest chemical manufacturing complex built in the United States and are critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place.
- . Condition and potential adverse impact. These structures are in deteriorated condition and are slated for demolition.

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

Gunpowder Meeting House (Building #E-5715)

- . Background and significance. This building possesses historic and architectural significance as a very early and fine example of the pre-military land use of this area. If the 1773 date of construction proves correct this may be the oldest surviving structure built as a Methodist Church in the country.
- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II properties.

CATEGORY III PROPERTIES

ABERDEEN AREA:

Family Housing - Colonel (Building #2, similar buildings: #3, 4, 5, 20, 21, 22, 23)

- . Background and significance. These buildings are part of a grouping of standard and identical officers' housing built in 1919 as some of the first permanent structures at APG. Their setting is attractive, and their design reflects the beginning of attempts to use regional architectural characteristics.
- . Condition and potential adverse impact. These structures are in excellent condition and no adverse impacts are planned at this time.

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - Colonel (Building #7, similar buildings: #10 and 25)

- . Background and significance. These buildings are part of a group of standardized officer's housing built in the 1930's with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material and detail alternates and were intended to reflect regional architecture.
- . Condition and potential adverse impact. These structures are in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - Colonel (Building #9, similar buildings: #31, 32, 40, 41, 42, 43, 44)

- . Background and significance: These buildings are part of a group of standardized officer's housing built in the 1930's with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material and detail alternates and were intended to reflect regional architecture.
- . Condition and potential adverse impact. These structures are in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Open Mess - Officers (Building #30)

- . Background and significance. This building is part of a group of standardized officer's housing built in the 1930's with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material and detail alternates and were intended to reflect regional architecture.
- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - Colonel (Building #33, similar buildings: #34, 35, 50)

- . Background and significance. These buildings are part of a group of standardized officer's housing built in the 1930's with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material and detail alternates and were intended to reflect regional architecture.
- . Condition and potential adverse impact. These structures are in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - Colonel (Building #39, similar building: #39G)

- . Background and significance: These buildings are standard officer's housing built in 1919 as some of the first permanent structures at APG.
- . Condition and potential adverse impact. These structures are good condition and no known adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - Colonel (Building # 52, similar buildings: #53, 54, 56, 57, 58)

- . Background and significance. These buildings are part of a group of standardized officer's housing built in the 1930's with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material and detail alternates and were intended to reflect regional architecture.
- . Condition and potential adverse impact. These structures are in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - Lt. Colonel - Major (Building #70, similar buildings: 71, 80, 81, 82, 83)

- . Background and significance: These buildings are part of a grouping of standard and identical officers' housing built in 1919

as some of the first permanent structures at APG. Their setting is attractive, and their design reflects the beginning of attempts to use regional architectural characteristics.

- . Condition and potential adverse impact. These structures are in good condition and no known adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - Colonel (Building #100, similar buildings: 101, 102-107, 110-119)

- . Background and significance. These buildings are part of a group of standardized officer's housing built in the 1930's with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material and detail alternates and were intended to reflect regional architecture.
- . Condition and potential adverse impact. These structures are in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Fire Station (Building #300)

- . Background and significance. This building is an example of standardized buildings of the New Deal Era built with Federal Emergency Works Funds and PWA/WPA labor. These buildings were

designed with different material alternates and were altered for different conditions. The design was intended to reflect regional architecture.

- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Latrine (Training Aids Center) (Building #T303)

- . Background and significance. This building is a part of the Main Front of APG, the site of all major ordnance, weapons and vehicle testing, proofing and research since 1918. This building is one of the few WWI-era buildings which remains and harmonizes with most of the others on the Main Front and headquarters administrative area.
- . Condition and potential adverse impact. This structure is in good condition and falls under the Army's order for temporary building removal.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Telephone Exchange Building (Building #311)

- . Background and significance. This building is one of the first buildings built at APG and remains in virtually the same condition. Its function was vital to the performance of APG's mission.

- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Ordnance Museum and Storage Building (Administration General Purpose:  
TECOM Headquarters) (Building #314)

- . Background and significance. This building's construction history is interesting as an example of an Army pre-fabricated building. The Ordnance Museum was originated here as ordnance returned from overseas after WWI. The collection held here for storage was used by the Ordnance School for instruction and later, through general interest and personal collection, became a full-fledged museum. It operated here until 1970.
- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Precision Machine Shop (Building #315)

- . Background and significance. Constructed in 1918 this building is one of the first buildings built at APG and remains in virtually the same condition. Its function was vital to the performance of APG's mission.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Carpenter Shop (Post Engineer Maintenance Shop) (Building #T-335)

- . Background and significance. This building is one of the first buildings built at APG and remains in virtually the same condition. Its function was vital to the performance of APG's mission.
- . Condition and potential adverse impact. This structure is in fair condition and falls under the Army's order for temporary building removal.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Storage Building (Small Arms and Range Facility) (Building #351)

- . Background and significance. This building is a part of the Main front of APG, the site of all major ordnance, weapons and vehicle testing, proofing and research since 1918. This building is one of the few remaining WWI-era buildings and harmonizes with most of the others on the Main Front and headquarters administrative area.
- . Condition and potential adverse impact. This structure is in good condition and no known adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Ordnance Facility (Building #368-D)

- . This building is a part of the Main Front of APG, the site of all major ordnance, weapons and vehicle testing, proofing and research since 1918. This building replaced an earlier, 1918 construction and harmonizes with most of the others on the Main Front and headquarters administrative area.
- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Chronograph Building (Building #380)

- . Background and significance. This building is a part of the Main Front of APG, the site of all major ordnance, weapons and vehicle testing, proofing and research since 1918. This building replaced an earlier, 1918 construction and harmonizes with most of the others on the Main Front and headquarters administrative area.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Powder Magazine (Building #394-A, similar buildings: 395, 396, 397, 440, 441, 442, 651)

- . Background and significance. These buildings are part of the Main Front of APG, the site of all major ordnance, weapons and vehicle testing, proofing and research since 1918. This building replaced an earlier, 1918 construction and harmonizes with most of the others on the Main Front and headquarters administrative area.

- . Condition and potential adverse impact. These structures are in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Bachelor Officers' Quarters (Building #T-2002, similar buildings: #T-2003, T-2004)

- . Background and significance. These are several of the many standardized plan mobilization buildings designed by the Quartermaster Corps and the Corps of Engineers to meet the mobilization needs of World War II. These buildings remain in their original context.
- . Condition and potential adverse impact. These buildings are in good condition and fall under the Army's order for temporary building removal.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Family Housing - NCO (Building #2020, similar buildings: #2021, 2025, 2026, 2027)

- . Background and significance. These buildings are part of a group of standardized officer's housing built in the 1930's with Federal Emergency Works Funds and PWA/WPA labor. These buildings were designed with different material and detail alternates and were intended to reflect regional architecture.
- . Condition and potential adverse impact. These structures are in excellent condition and are slated for demolition.

- . Preservation options. See the general preservation recommendations at the beginning of the chapter for Category III properties.

Unit Chapel (Building #T-2030, similar building: #T-3244)

- . Background and significance: These are two of the many standardized plan mobilization buildings designed by the Quartermaster Corps and the Corps of Engineers to meet the mobilization needs of World War II. These buildings remain in their original context.
- . Condition and potential adverse impact. These structures are in good condition and fall under the Army's order for temporary building removal.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Dickson Hall Auditorium (Building #3074)

- . Background and significance. This building comprises part of the U.S. Army Ordnance School complex. This officers' training center is a harmonious and formal architectural group and is important in APG and military history. This building is a minor element in that grouping.
- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Fire Control Instrument Building (Building #3144)

- . Background and significance. This building contains functions essential to APG's performance and the Ordnance School's activities. It is a good example of mid-40's Modern architecture.
- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

EDGEWOOD AREA:

Chemical Warfare School (Chemical Directorate) (Building #E1570)

- . Background and significance. This structure was constructed for the Chemical Warfare School when the school was moved from Lakehurst, New Jersey, to Edgewood Arsenal following World War I. It served as the Chemical Warfare School until the 1950's when the school was moved to Fort McClellan, Alabama.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Fire Station (Company Headquarters Building) (Building #E1605)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.
- . Condition and potential adverse impact. This structure is in fair condition and is slated for demolition.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Hospital Complex (Building #E1671 and E1673)

- . Background and significance. This building was constructed during World War I and served as part of an administrative and hospital complex.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Officers Mess (Building #E1677)

- . Background and significance. This building was constructed during World War I and served as part of an administrative and hospital complex.
- 74

- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

High Explosive Magazine - Bulk (Building #E2148, similar buildings:  
#E2150, E2550, E2552, E2554)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Booster and Adaptor Storage (Building #E4060)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas. This building is the sole remaining Booster and Adaptor storage facility for the chemical shell filling plants.
- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Veterinary Facility (Building #E4162)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.
- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Fort Hoyle Riding Hall (Building #E4210)

- . Background and significance. Originally constructed as the horse training arena for the Sixth Field Artillery, this building represents the only tangible remainder of Fort Hoyle created from part of Edgewood Arsenal in 1922.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Barracks without Mess (Building #SE4465, similar buildings: SE4405, SE4410, SE4415, SE4420, SE4430, SE4435, SE4440, SE4455, SE4460, SE4470, SE4475, SE4480)

- . Background and significance. These buildings comprise a World War I cantonment area with barracks of permanent construction. These buildings are in tact and in context.
- . Condition and potential adverse impact. These structures are in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Office Building #1 - Arsenal Operations Depot (Building #E5101)

- . Background and significance. This building represents the World War II expansion at the Edgewood Arsenal and features distinctive architectural detailing.
- . Condition and potential adverse impact. This structure is in excellent condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Gauge Laboratory (Caliber Test Facility) (Building #E5106)

- . Background and significance. Part of World War II industrial expansion, these facilities represented a military investment in chemical preparedness. They were built on the World War I industrial site to update and expand chemical production and shell loading operations.
- 71

- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Pilot Plant (Building #E5135)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Shell Dumps (Building #E5158, similar buildings: #E5165 and E5179)

- . Background and significance. Originally built in 1918, these buildings represent the response of the United States to the use of chemical weapons during World War I. These structures are the remainders of the largest chemical manufacturing complex built in the United States and are critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists today.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Fire Station (Building #E5180)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

H.S. Munitions Filling Plant (Building #E5185)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

FS, CNS, CNB Filling Plant (Building #E5188)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Clothing Renovating Plant (Building #E5238)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Smoke Munitions Plant (Building #E5265)

- . Background and significance. Originally built in 1918, this building represents the response of the United States to the use of chemical weapons during World War I. This structure is the

remainder of the largest chemical manufacturing complex built in the United States and are critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place.

- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Inciendiary Bomb Materials Storage Warehouse (Building #E5282)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in deteriorated condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Blending Facility (Building #E5284)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I

industrial site to update and expand chemical production and shell loading operations.

- . Condition and potential adverse impact. This structure is in deteriorated condition and is slated for demolition.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Incinerator (Fire Fighting Training Building) (Building #E5292)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.
- . Condition and potential adverse impact. This structure is in deteriorated condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Experimental Laboratory (Building #E5317)

- . Background and significance. Built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.

- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

L3 Mixing Building - U.S. Filling Plant (Building #E5360)

- . Background and significance. Originally built in 1918, this building represents the response of the United States to the use of chemical weapons during World War I. This structure is the remainder of the largest chemical manufacturing complex built in the United States and are critical to the understanding of the role of chemical warfare in U.S. military history. However, little, if any, original machinery exists in place.
- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

S-4 Mixing Plant (Building #E5365)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.

- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

CN Cyanide Manufacturing Plant (Building #E5380)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in deteriorated condition and no adverse impacts at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

H.C. Filling Plant Warehouse; Applied Instruction Building (Building #E5429)

- . Background and significance. Possibly built during World War I, this structure provided necessary support facilities for the main industrial function of Edgewood Arsenal, that of manufacturing chemicals and preparing chemical projectiles for use overseas.
- . Condition and potential adverse impact. This structure is in fair condition and no adverse impacts are planned at this time.

- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

CG Filling Plant (Building #E5604)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Shell Assembly Plant (Building #E5826)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

Shell Loading Plant (Building #E5830)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

San Domingo Area Assembly Building (Building #E5840)

- . Background and significance. Part of World War II industrial expansion, this facility represented a military investment in chemical preparedness. This was built on the World War I industrial site to update and expand chemical production and shell loading operations.
- . Condition and potential adverse impact. This structure is in good condition and no adverse impacts are planned at this time.
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III properties.

NOTES

1. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984)
2. National Park Service, Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings, 1983 (Washington, D.C.: Preservation Assistance Division, National Park Service, 1983)
3. Historic American Buildings Survey/Historic American Engineering Record, National Park Service, Annotated Standards for Structural Documentation (Washington, D.C.: HABS/HAER, May 1983)
4. National Park Service, Secretary of the Interior's Standards
5. Historic American Buildings Survey/Historic American Engineering Record, Annotated Standards
6. Ibid.

87

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APPENDIX A

AN OVERVIEW OF  
STANDARDIZED MILITARY  
CONSTRUCTION  
1917-1945

The involvement of the United States in two world wars and other conflicts required the nation to enact a series of mobilization plans. These plans were designed to meet the needs of an army at war. In responding to the calls for mobilization, the nation's industrial community redirected their efforts from the production of consumer goods to war materials. Almost overnight, assembly lines that had been producing automobiles were now producing tanks and planes. America did its best to make up for lost time. Not only did America's industrial strength lack the orientation that was required, but America also had no large standing army. The call for manpower went out, and in a matter of months, for both world wars, the United States would have the largest conscription in its history. To meet the needs of these new armies, facilities were needed to house and feed the troops (cantonments) and facilities were needed to train the new army. In 1917, 32 cantonment camps were needed to train the troops that were to see service in Europe, and the demand required for the Second World War was even greater.

In an effort to achieve this construction by the quickest and most efficient possible means, it was soon apparent that a form of construction that could be quickly and cheaply erected with a minimum amount of skilled labor would be required. The answer lay in the development of a standardized set of buildings that could be erected anywhere, by unskilled labor, and adaptable to specialized uses as the situation required without major problems. A series of plans were developed by the Quartermaster Corps Construction Division known as the 600 series. These plans were utilized in the construction of the 332 World War I cantonment camps erected to train American troops prior to their joining the war in Europe. The early 600 series buildings were simple wooden frame structures set on wood piers and covered with board and batten siding. Although simple and easily erected, these structures left much to be desired.

Latrines were outside the barracks, quarters were small and not always suited to the size of companies, buildings were heated by wood stoves, and the wood piers were susceptible to rot and termite damage. With the close of hostilities in Europe, the nation was to return to a period of peacetime activity, marked by the economic ups and downs of the twenties and thirties.

The period between the wars can best be characterized as a period of limited military construction; however, the 600 series plans were not forgotten. Using the information and experience gained by the use of the 600 series plans a new, more modern set of plans was developed. Major alterations included: changes in building sizes and detail of construction (due to changes in the lumber milling industry; sizes used in 1917 were no longer produced), modernization of heating and sanitation, sounder construction, (concrete piers and termite shields, as well as engineering modifications), and the enlargement of quarters. Known as the 700 series plans, these plans were to be continually revised and updated as time and military allocation monies would allow. However, as the nation's economic problems continued to grow, military allocations for such work declined. Work on the 700 series correspondingly declined; indeed many of the drawings done for the series were lost. It was not until President Roosevelt introduced programs under the New Deal Administration that the need arose for a cheap and economic means of construction, as well as "make-work" projects for architects and engineers. Utilizing monies allocated to the Public Works Administration, the 700 series plans were resurrected, often from memory, revised, modernized, and modified. By 1940, series 700 contained over 300 different structures as well as roads, camp and cantonment layouts, and utilities.

The Civilian Conservation Corps also used standardized building concepts in their construction efforts. They used a panelized system which was extremely flexible, demountable and portable. Standard plans were produced indicating which panels were to be used and where. When the

time came to move the building, the panels were removed (demounted) from their framing members. The various other parts of the building were disassembled, and the whole thing was loaded onto a truck and taken to a new location for reerection. There were even plans for reuse of the components as cottages. At the beginning of the World War II mobilization CCC buildings were used for troop housing and other functions until Army construction was complete.

The invasion of Poland by Hitler in 1939 was a forewarning of the nation's future. The military responded with preliminary formal planning. With the bombing of Pearl Harbor and the declaration of war that followed, America again had to mobilize for war. Construction actually began prior to the declaration of war, relying on the old 700 series plans, and simultaneously, a revised set of construction plans were being developed: the 800 series. Although the 800 series was not completed in time for use in the cantonment camps built in 1940 and early 1941, (they were finished in the spring of 1941) they were used in building cantonments and other facilities starting in 1942.

Major changes were made between the 700 and 800 series structures. The structures were made stronger, utilities more elaborate and modern, and quarters were made spacious and fit most army units better. Warehouses were made larger and mess halls were arranged for more efficient service. Buildings were better insulated and were well heated, using better and safer heating systems. Many other features such as ratproofing, exit lighting, etc., made life a little better for the men and women using these buildings. Facilities built to the new designs were considered by many to be semi-permanent, not temporary.

The 600, 700, and 800 series drawings were not limited to building plans, framing plans, and elevations. Standard sets of details were also developed including architectural, mechanical, electrical, and plumbing details. These details were noted and called out on the building drawings by their standard series numbers, and pulled from a file for use.

Although details were used for many different buildings, each building type was a unique design. Each building type was designed specifically for this purpose, be it a mess hall, barrack, administration building, or shop, although an eye was always kept towards a simple, easily altered and constructed design. The buildings within a series were very similar—they are basically rectangular and have similar dimensions, proportions, and openings, but the series of standard mobilization buildings should not be thought of as being generated from only one or two basic buildings.

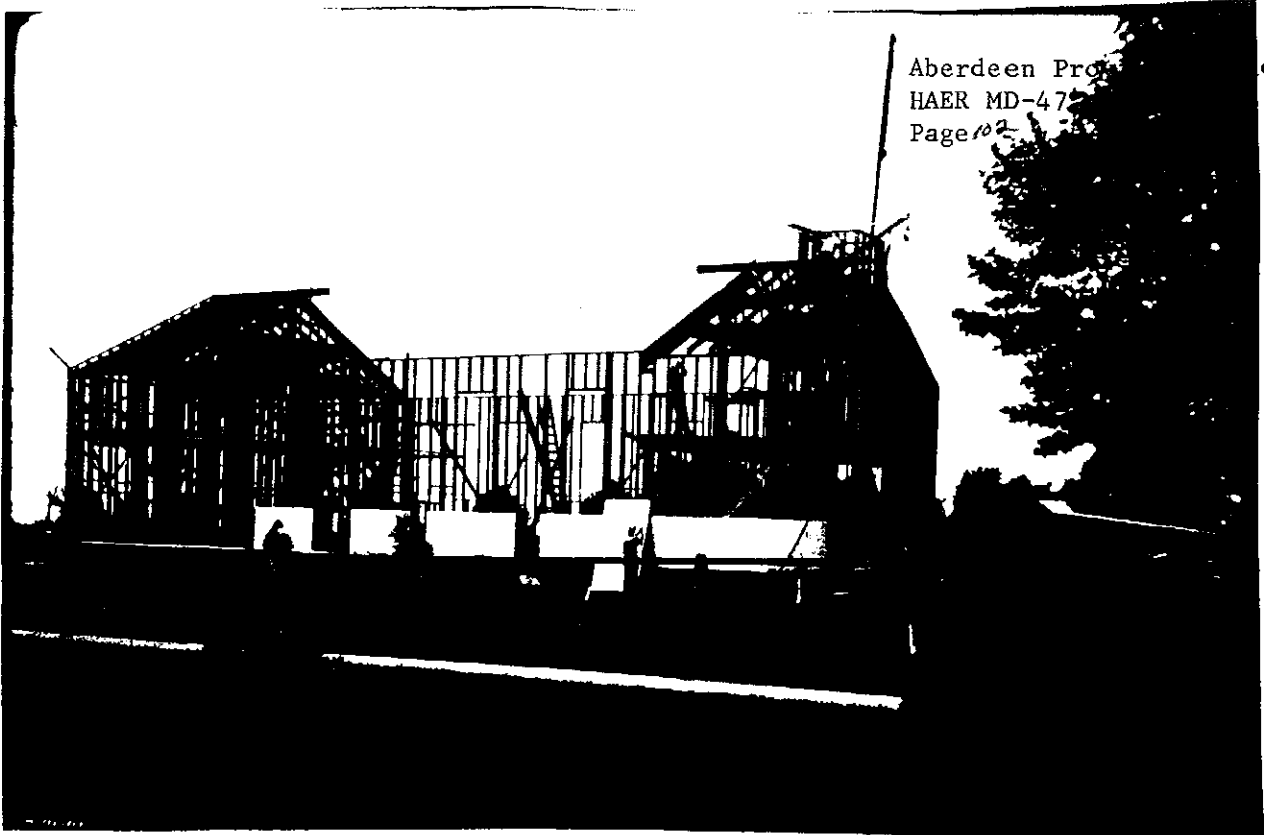
The rectangular shape of these buildings is only logical, as is the standardization of opening types and materials. The concept of standardization, as well as the constraints of time, economy, and construction methods and materials, is the basis for that reasoning. Most building types, except those specialized types such as hospitals company officer's family quarters, and the like are easily adaptable to different purposes. The Army's architects and engineers designed this adaptability into the series buildings, even producing some designs which included alternates or dimension choices which increased the usefulness of the designs. This adaptability is part of the reason behind the misconception that these buildings are just "alterations" of one or two basic buildings. Each building type within a series standardized building set is of a unique design, meant to meet a useful purpose.

We do not know the extent to which the military made use of standardized construction; the earliest series reference found is to the 600 series at A.P.G. We have found no evidence for an earlier numbered series, and do not believe that one existed. Standardized construction was being used before 1917 in other military, quasi-military and private construction. The United States Life Saving Service, (combined in 1915 with the Revenue Cutter Service to form the Coast Guard) was making use of standardized plans in 1874, when a series of life saving stations were built on the Outer Banks of North Carolina. There are several examples of standardized officers' quarters on military installations across the country from the last decades of nineteenth century.

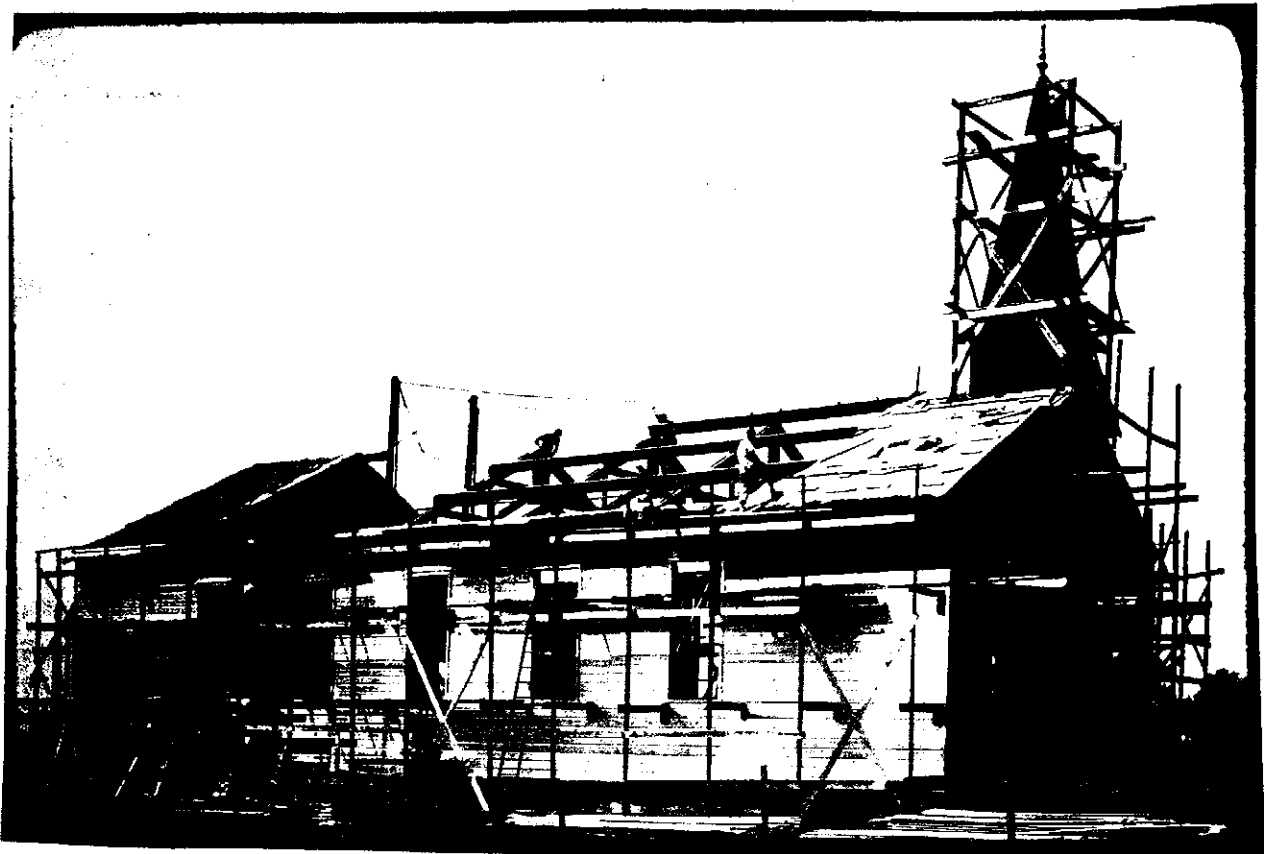
Following are a series of photos taken during the erection of a standard regimental chapel at Edgewood Arsenal, Maryland, during the summer of 1941. The chapel is 700 series, #700-1801, type CH01, and is wood frame construction on concrete foundation, sometimes built on concrete piers, and is sided with horizontal shiplap siding. Today, two such chapels remain within the Aberdeen Proving Ground and are still in use. Also, included is a photo of the same chapel from a different Army installation, location unknown. While the chapel is a specialized use structure, it is found in cantonments and is a good example of standardized mobilization buildings.



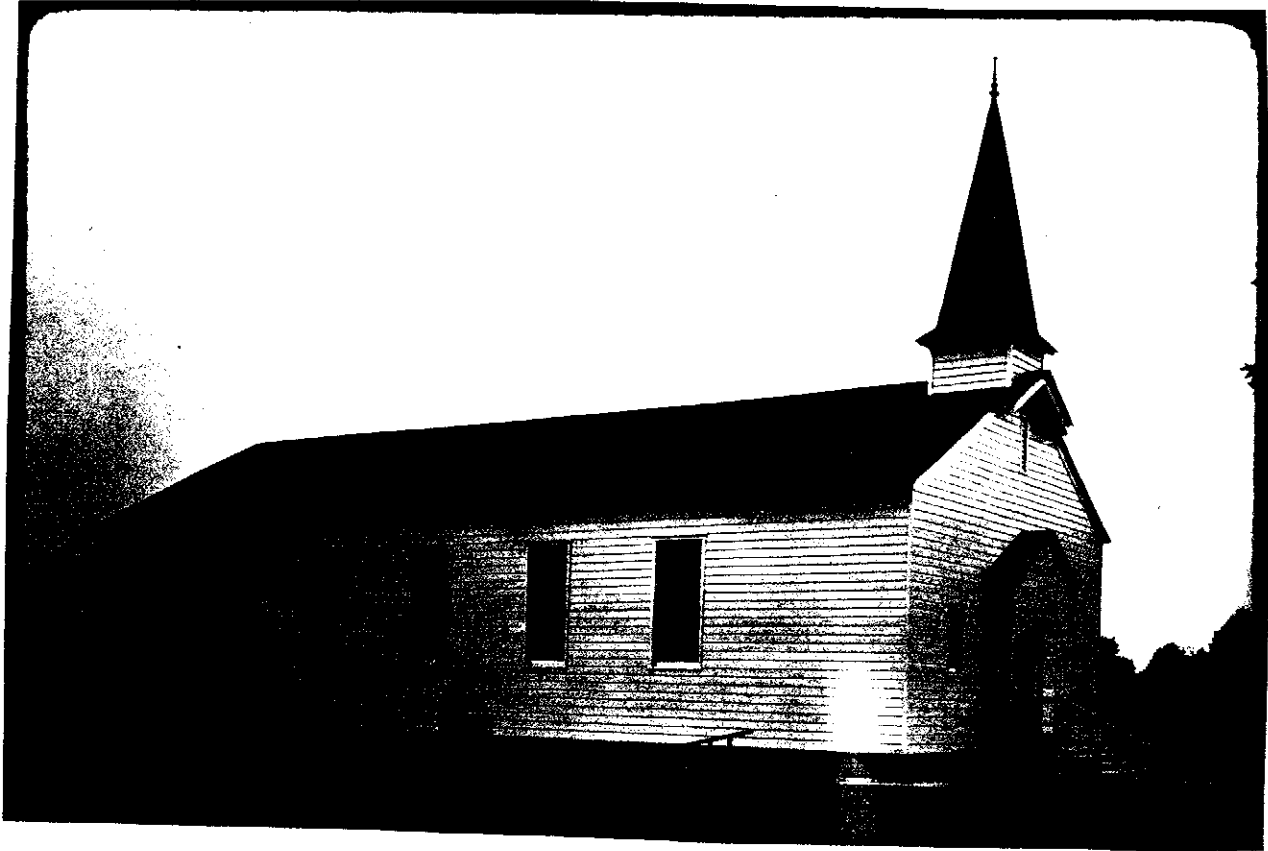
700 Series Chapel Under Construction  
Edgewood Area, Aberdeen Proving Ground, MD, June 26, 1941  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD



Cantonment Chapel  
Edgewood Area, Aberdeen Proving Ground, MD, July 14, 1941  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD



Cantonment Chapel  
Edgewood Area, Aberdeen Proving Ground, MD, July 28, 1941  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD



Cantonment Chapel  
Edgewood Area, Aberdeen Proving Ground, MD, September 30, 1941  
Source: TECOM Historical Office, Aberdeen Proving Ground, MD

Standardization was applied beyond the construction and design of buildings into the layout and site planning of cantonment camps and cantonment areas of Army installations. The term "cantonment" can be used in two ways: referring to only the troop quarters area of camp, including mess halls and other troop support buildings, or referring to an entire camp used for quartering, training, supply and other functions. This larger cantonment is sometimes called a divisional cantonment, as the basic ordering unit for this size area was the Army division, just as company and battalion sizes dictated the sizes of smaller areas within larger ones.

The site planning of cantonments, in either sense of the word, was a matter of great concern and study for the Army. Troop safety and economics of time, materials, and funds were the goals of proper cantonment planning. An article in "Civil Engineering", August 1945, by Leon Zach, then Chief, Site Planning Section, Military Construction Branch, Engineering Development Division, Office, Chief of Engineers, pointed out the major considerations in cantonment layout and site planning during the Second World War.

Information used for planning included space allotments, number of men to be accommodated, and recommendations from specialized branches of the Army. Among the most important considerations were those of fire safety and traffic circulation. Distances between activities was also an issue.

Fire safety is an obvious problem in any area of densely populated wooden structures, and standards were established for spacing buildings and creating firebreaks between groups of buildings. However, buildings were spaced as closely together as fire safety would allow, to achieve economy of roads, utilities and land.

Typical layouts were devised and accompanied by instructions in an Engineering Manual from the Corps of Engineers. These instructions called for consideration of circulation patterns to and from various

activity areas. In this sense, the cantonment was thought of as a small and self-contained city, with separate zones for officer, enlisted, and family housing, industrial, warehouse-utility, hospital and "civic center" areas. The "civic center" contains amenities such as bank, post exchange, laundry, barber shop, etc. The distance between troop housing and troop training areas was not to be more than a half hour's marching distance; circulation in general was to simple, direct, and unobstructed. A modified grid plan was most often used. Different types of circulation were not to interfere with one another, to the extent that ideally each regimental unit could pass to its training area without interference by traffic from another regimental unit.

Special consideration was given to the location of hospitals; they were not to be placed in busy or noisy areas, but were to be convenient to troop housing and training areas, with separate circulation or service and patient entrances. A hospital area was not to be placed where prevailing winds would carry dust or smoke generated by vehicles, as in an armor division, or by people. The problem of dust also influenced the placement of troop housing where climate and activity increased the probability of dust.

Diagrammatic plans for cantonments including training areas were produced and used as general aids for site planning. The planner of the individual installation was expected to adjust the recommended layout to meet the programmatic and site-related conditions of the area.

Greater economy of roads, utilities, land, and construction was achieved as knowledge of the performance of cantonment layout increased. Road length in a typical cantonment was reduced as much as 44 percent over the original scheme between October 1940 and May 1942. Comparable savings were made in utility piping and construction.

Similar principles were applied to civilian war community housing. There, it was found that irregular street layouts, similar to suburban street layouts, were preferable. There was need for a pleasant appearance, not monotonous and drab; troop housing had to be formally and militarily arranged, hence barracks in rows. The irregular layout was also economical in terms of road length and utilities length. Pleasant vistas, light and air, and fire safety were considerations as well as security, distances to activities, and circulation. The irregular layout also made it easier for the site planners to treat the site sensitively and economically in terms of contour grading and views. Statutory limits of \$4000 per unit made economy one of the major limits to design and layout of civilian housing.

The use of standardized construction in military application is a fascinating area of research in which more work needs to be done. The limited research conducted at Aberdeen Proving Ground, although facilitated by the microfilm system of drawing storage, and the assistance and experience, coupled with interest of Mr. Paul Wirtz, Deputy Director, Facilities Engineering Directorate, Aberdeen Proving Ground, has made small inroads into the work that should be done.